



Cisco 7200 VXR Installation and Configuration Guide

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- Turn the television or radio antenna until the interference stops.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.
- Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

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Preface

Document Revision History

The Document Revision History beginning with this online part number, records technical changes to this document.

Document Version	Date	Change Summary
OL-5013-07	December, 2006	Adding NPE-G2 CWDM information.
OL-5013-07	May, 2006	Adding the NPE-G2 information.
OL-5013-06	March, 2006	Adding the Port Adapter Jacket Card and new NPE-G1 temperature threshold information.
OL-5013-05	September, 2005	This version removes the MEM-I/O-D-FLD32M and the MEM-I/O-D-FLD48M product identification from the document, as the part is end-of-sale, and adds statement numbers to warnings.

This preface describes who should read the *Cisco 7200 VXR Installation and Configuration Guide* it is organized, and its document conventions.

Cisco documentation and additional literature are available in the Product Documentation DVD package, which may have shipped with your product. The Product Documentation DVD is updated regularly and may be more current than printed documentation. See “[Product Documentation DVD](#)” section on [page xvii](#) for more information.

You can access the most current Cisco documentation on the World Wide Web at <http://www.cisco.com>. Translated documentation is available at http://www.cisco.com/public/countries_languages.shtml.

Audience

the Cisco 7200 VXR routers. It contains procedures for unpacking and installing the router hardware, creating a basic software configuration file, and starting up the router. After completing the installation and basic configuration procedures covered in this guide, you will then use the appropriate companion publications to more completely configure your system.

Organization

The major sections of this guide are as follows:

Chapter	Title	Description
		Describes safety considerations, tools required, and gives an overview of the installation and procedures you should perform <i>before</i>
Chapter 4	Observing System Startup and Performing a Basic Configuration	Describes the procedures for completing a basic system configuration and for checking and saving this configuration to system memory.
Chapter 5	Troubleshooting the Installation	Describes troubleshooting procedures for the hardware installation.
Appendix A	Configuration Register Information	Provides configuration register information.

Document Conventions

boldface	boldface
[]	Elements in square brackets are optional.
{ x y z }	Alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string, or the string will include the quotation marks.

screen	screen
boldface screen	boldface screen
<i>italic screen</i>	<i>italic screen</i>
→	
^	The symbol ^ represents the key labeled Control —for example, the key combination ^D Control D
< >	Nonprinting characters, such as passwords, are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.



Note

reader take note



Caution

Warning Definition



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the translated safety warnings that accompanied this device.

Statement 1071

Note: SAVE THESE INSTRUCTIONS

Note: This documentation is to be used in conjunction with the specific product installation guide that shipped with the product. Please refer to the Installation Guide, Configuration Guide, or other enclosed additional documentation for further details.

Waarschuwing

BELANGRIJKE VEILIGHEIDSIINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Voor een vertaling van de waarschuwingen die in deze publicatie verschijnen, dient u de vertaalde veiligheidswaarschuwingen te raadplegen die bij dit apparaat worden geleverd.

Opmerking BEWAAR DEZE INSTRUCTIES.

Opmerking Deze documentatie dient gebruikt te worden in combinatie met de installatiehandleiding voor het specifieke product die bij het product wordt geleverd. Raadpleeg de installatiehandleiding, configuratiehandleiding of andere verdere ingesloten documentatie voor meer informatie.

Varoitus

TÄRKEITÄ TURVALLISUUTEEN LIITTYVIÄ OHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä asiakirjassa esitettyjen varoitusten käännökset löydät laitteen mukana toimitetuista ohjeista.

Huomautus SÄILYTÄ NÄMÄ OHJEET

Huomautus Tämä asiakirja on tarkoitettu käytettäväksi yhdessä tuotteen mukana tulleen asennusoppaan kanssa. Katso lisätietoja asennusoppaasta, kokoonpano-oppaasta ja muista mukana toimitetuista asiakirjoista.

Attention IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez les consignes de sécurité traduites qui accompagnent cet appareil.

Remarque CONSERVEZ CES INFORMATIONS

Remarque Cette documentation doit être utilisée avec le guide spécifique d'installation du produit qui accompagne ce dernier. Veuillez vous reporter au Guide d'installation, au Guide de configuration, ou à toute autre documentation jointe pour de plus amples renseignements.

Warnung WICHTIGE SICHERHEITSANWEISUNGEN

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewusst. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise sind im Lieferumfang des Geräts enthalten.

Hinweis BEWAHREN SIE DIESE SICHERHEITSANWEISUNGEN AUF

Hinweis Dieses Handbuch ist zum Gebrauch in Verbindung mit dem Installationshandbuch für Ihr Gerät bestimmt, das dem Gerät beiliegt. Entnehmen Sie bitte alle weiteren Informationen dem Handbuch (Installations- oder Konfigurationshandbuch o. Ä.) für Ihr spezifisches Gerät.

Figyelem FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Per le traduzioni delle avvertenze riportate in questo documento, vedere le avvertenze di sicurezza che accompagnano questo dispositivo.

Nota CONSERVARE QUESTE ISTRUZIONI

Nota La presente documentazione va usata congiuntamente alla guida di installazione specifica spedita con il prodotto. Per maggiori informazioni, consultare la Guida all'installazione, la Guida alla configurazione o altra documentazione acclusa.

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

Dette varselssymbolet betyr fare. Du befinner deg i en situasjon som kan forårsake personskade. Før du utfører arbeid med utstyret, bør du være oppmerksom på farene som er forbundet med elektriske kretssystemer, og du bør være kjent med vanlig praksis for å unngå ulykker. For å se oversettelser av advarslene i denne publikasjonen, se de oversatte sikkerhetsvarslene som følger med denne enheten.

Merk TA VARE PÅ DISSE INSTRUKSJONENE

Merk Denne dokumentasjonen skal brukes i forbindelse med den spesifikke installasjonsveiledningen som fulgte med produktet. Vennligst se installasjonsveiledningen, konfigureringsveiledningen eller annen vedlagt tilleggsdokumentasjon for detaljer.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. O utilizador encontra-se numa situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha em atenção os perigos envolvidos no manuseamento de circuitos eléctricos e familiarize-se com as práticas habituais de prevenção de acidentes. Para ver traduções dos avisos incluídos nesta publicação, consulte os avisos de segurança traduzidos que acompanham este dispositivo.

Nota GUARDE ESTAS INSTRUÇÕES

Nota Esta documentação destina-se a ser utilizada em conjunto com o manual de instalação incluído com o produto específico. Consulte o manual de instalação, o manual de configuração ou outra documentação adicional inclusa, para obter mais informações.

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Vea las traducciones de las advertencias que acompañan a este dispositivo.

Nota GUARDE ESTAS INSTRUCCIONES

Nota Esta documentación está pensada para ser utilizada con la guía de instalación del producto que lo acompaña. Si necesita más detalles, consulte la Guía de instalación, la Guía de configuración o cualquier documentación adicional adjunta.

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Se översättningarna av de varningsmeddelanden som finns i denna publikation, och se de översatta säkerhetsvarningarna som medföljer denna anordning.

OBS! SPARA DESSA ANVISNINGAR

OBS! Denna dokumentation ska användas i samband med den specifika produktinstallationshandbok som medföljde produkten. Se installationshandboken, konfigurationshandboken eller annan bifogad ytterligare dokumentation för närmare detaljer.

Предупреждение **ВАЖНЫЕ СВЕДЕНИЯ ПО БЕЗОПАСНОСТИ**

Этот символ предупреждает о наличии опасности. При неправильных действиях возможно получение травм. Перед началом работы с любым оборудованием необходимо ознакомиться с ситуациями, в которых возможно поражение электротоком, и со стандартными действиями для предотвращения несчастных случаев. Переведенный текст предупреждений содержится в соответствующем документе, поставляемом вместе с устройством.

Примечание **СОХРАНЯЙТЕ ЭТУ ИНСТРУКЦИЮ**

Примечание Эта инструкция должна использоваться вместе с руководством по установке конкретного изделия, входящим в комплект поставки. Дополнительные сведения см. в руководстве по установке, руководстве по настройке и другой документации, поставляемой с изделием.

警告 **有关安全的重要说明**

这个警告符号指有危险。您所处的环境可能使身体受伤。操作设备前必须意识到电流的危险性，务必熟悉操作标准，以防发生事故。如果需要了解本说明中出现的警告符号的译文，请参阅本装置所附之安全警告译文。

注意 保存这些说明

注意 本文件应与本产品附带的具体安装说明一并阅读。如欲了解详情，请参阅《安装说明》、《配置说明》或所附的其他文件。

警告 **安全上の重要な注意事項**

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止対策に留意してください。このマニュアルに記載されている警告の各国語版は、装置に付属の「Translated Safety Warnings」を参照してください。

注 これらの注意事項を保管しておいてください。

注 この資料は、製品に付属のインストレーション ガイドと併用してください。詳細は、インストレーション ガイド、コンフィギュレーション ガイド、または添付されているその他のマニュアルを参照してください。

Terms and Acronyms

- data; found either incorporated into the processor or near it.
- CWDM GBIC—Coarse Wavelength-Divison Multiplexing Gigabit Interface Converter
- DCE—data communications equipment
- DMA—direct memory access
- DRAM—dynamic random-access memory
- DTE—data terminal equipment

- EPROM—erasable programmable read-only memory
- FRU—field-replaceable unit (router components that do not require replacement by a Cisco-certified service provider)

GBIC—Gigabit Interface Converter

Gbps—gigabits per second

Instruction and data cache—Instructions to the processor and data on which the instructions work.

Integrated cache—Cache that is built into the processor; sometimes referred to as internal cache. Cache memory that is physically located outside the processor is not integrated, and is sometimes referred to as external cache.

MB—megabyte

NVRAM—nonvolatile random-access memory

OIR—online insertion and removal

PCI—Peripheral Component Interconnect

PCMCIA—Personal Computer Memory Card International Association

Primary, secondary, tertiary cache—Hierarchical cache memory storage based on the proximity of the cache to the core of the processor. Primary cache is closest to the processor core and has the fastest access. Secondary cache has slower access than primary cache, but faster access than tertiary cache.

RFI—radio frequency interference

RISC—reduced instruction set computing

SDRAM—synchronous dynamic random-access memory

SIMM—single in-line memory module

SNMP—Simple Network Management Protocol

SRAM—static random-access memory

TFTP—Trivial File Transfer Protocol

Unified cache—Instruction cache and data cache are combined. For example, a processor may have primary cache with separate instruction and data cache memory, but unified secondary cache.

Related Documentation

Your Cisco 7200 VXR router and the Cisco IOS software running on it contain extensive features and functionality, which are documented in the following resources:

- [Cisco 7200 Series Routers Documentation Roadmap](http://www.cisco.com/en/US/products/hw/routers/ps341/products_documentation_roadmap09186a00801c0915.html)
http://www.cisco.com/en/US/products/hw/routers/ps341/products_documentation_roadmap09186a00801c0915.html for a list of all Cisco 7200 series routers documentation and troubleshooting tools and information.

[Cisco 7200 Series Routers Port Adapter Documentation Roadmap](#)

[Cisco 7200 Series Routers Troubleshooting Documentation Roadmap](#)

Obtaining Documentation

Cisco.com

Product Documentation DVD

DOC-DOCDVD=) from Cisco Marketplace at this URL:

<http://www.cisco.com/go/marketplace/>

Ordering Documentation

tech-doc-store-mkpl@external.cisco.com or by fax at 1 408 519-5001 in the United States and Canada, or elsewhere at 011 408 519-5001.

Documentation Feedback

Cisco Product Security Overview

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Reporting Security Problems in Cisco Products

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Tip

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Obtaining Technical Assistance

Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website



Note

Tools & Resources		
Cisco Product Identification Tool		Cisco
Product Identification Tool		show

Submitting a Service Request

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

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- *iQ Magazine*

technology investment decisions. You can access iQ Magazine at this URL:

<http://www.cisco.com/go/iqmagazine>

or view the digital edition at this URL:

<http://ciscoiq.texterity.com/ciscoiq/sample/>

Internet Protocol Journal





Cisco 7200 VXR Product Overview

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Warning

Before you install, operate, or service the system, read the “Site Preparation and Safety” section of the *Regulatory Compliance and Safety Information for the Cisco 7200 Series Routers*

Statement 200

Physical Description

**Note**

Configuration Guidelines

Cisco 7200 Series Port Adapter Hardware

immediately takes over the router's power requirements without interrupting normal operation of the router.

Environmental monitoring and reporting functions—Allow you to maintain normal system operation by resolving adverse environmental conditions prior to loss of operation.

Downloadable software—Allows you to load new images into Flash memory remotely, without having to physically access the router, for fast, reliable upgrades.

Table 1-1 Physical Specifications

	Specification
	<ul style="list-style-type: none"> • • •
	controller, maximum number of port adapters, 2 power supplies, and a fan tray: ~ 50 lb (22.7 kg)
Heat dissipation	370W (1262 BTU ²)
Chassis fan noise levels—single speed fan	Tested: <ul style="list-style-type: none"> Front (I/O controller and port adapter side) 44.2 dB Back (power supply side) 43.7 dB Left (fan side) 47.2 dB Right 44.8 dB Maximum: 65 dBA
Airflow	~80 cfm ³
Temperature	32 to 104°F (0 to 40°C) operating; –4 to 149°F (–20 to 65°C) nonoperating
Humidity	10 to 90% noncondensing
Power Specifications	
	⁴ wide input with power factor correction
AC-input current rating	5A ⁵ at 100–240 VAC with the chassis fully configured
AC-input frequency rating	50/60 Hz ⁶
AC-input cable	18 AWG ⁷ three-wire cable, with a three-lead IEC-320 receptacle on the power supply end, and a country-dependent plug on the power source end
DC-output power	280W maximum (with either a single or dual power supply configuration)
DC-input voltage rating	–48 VDC ⁸ nominal in North America –60 VDC nominal in the European Community

Physical Specifications (continued)

1. Mbps = megabits per second
2. BTU = British thermal units
3. cfm = cubic feet per minute
4. VAC = volts alternating current
5. A = amperes
6. Hz = hertz
7. AWG = American Wire Gauge
8. VDC = volts direct current



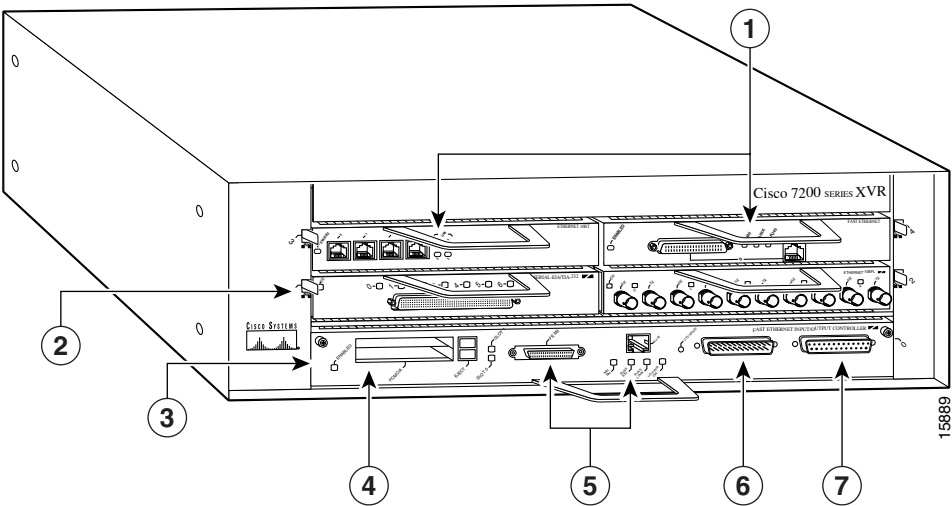
Software Requirements

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Cisco 7204VXR Overview

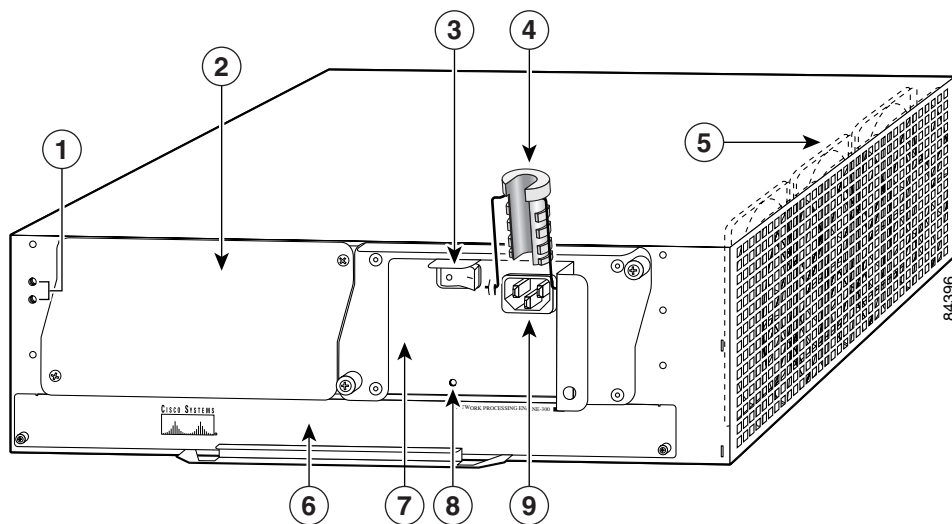

Note

Figure 1-1 Cisco 7204VXR Router—Front View



1		5	
2		6	
3		7	
4			





		8	PWR OK LED
	AC power cable-retention clip	9	
5			



**Caution****Note**

Cisco 7206VXR Overview

**Note**

**Note**

Figure 1-3 Cisco 7206VXR Router—Front View

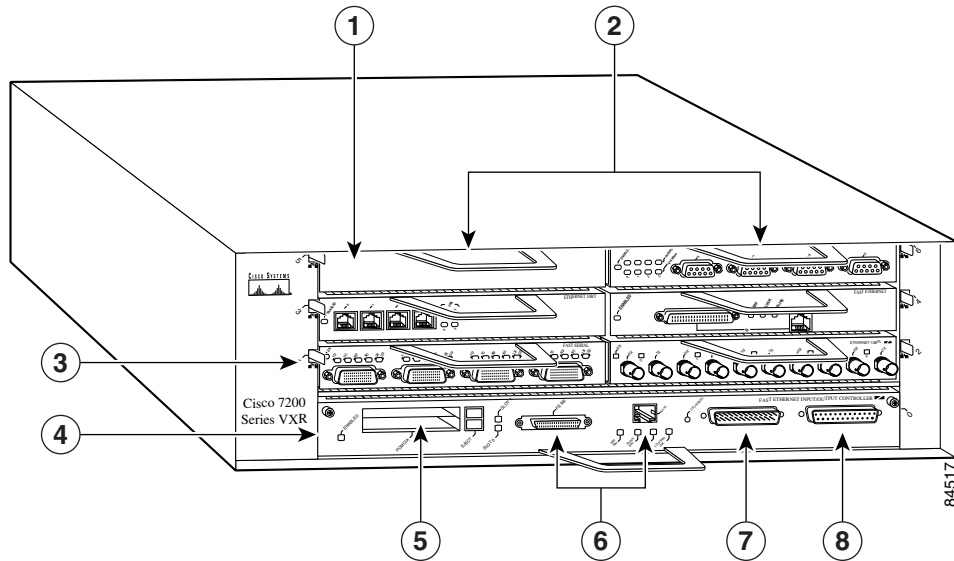
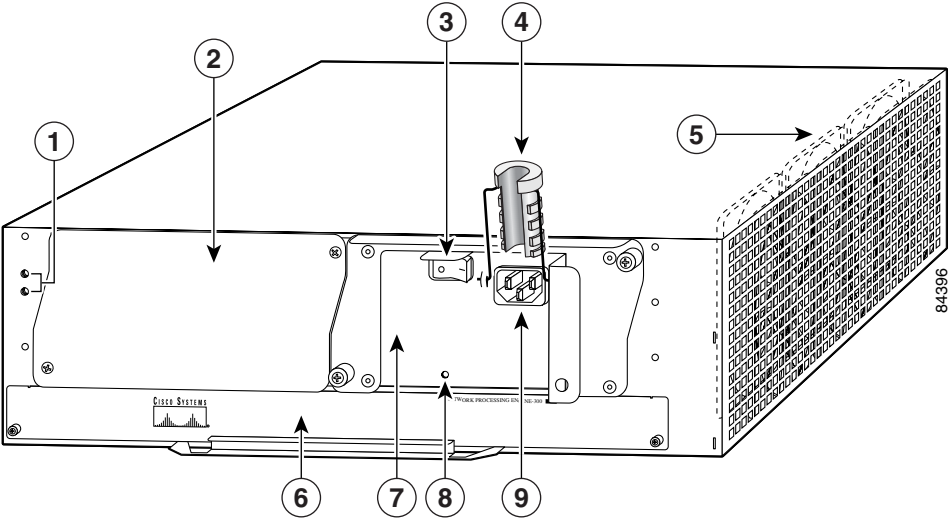


Figure 1-4 Cisco 7206VXR Router—Rear View







Caution



Note

Field-Replaceable Units

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Note

[280-Watt AC-Input Power Supply Replacement Instructions](#)

Network Processing Engine or Network Services Engine



Note

Network Processing Engine and Network Services Engine Installation and Configuration

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a BCM 1250 microprocessor that operates at an internal clock speed of 700 MHz.

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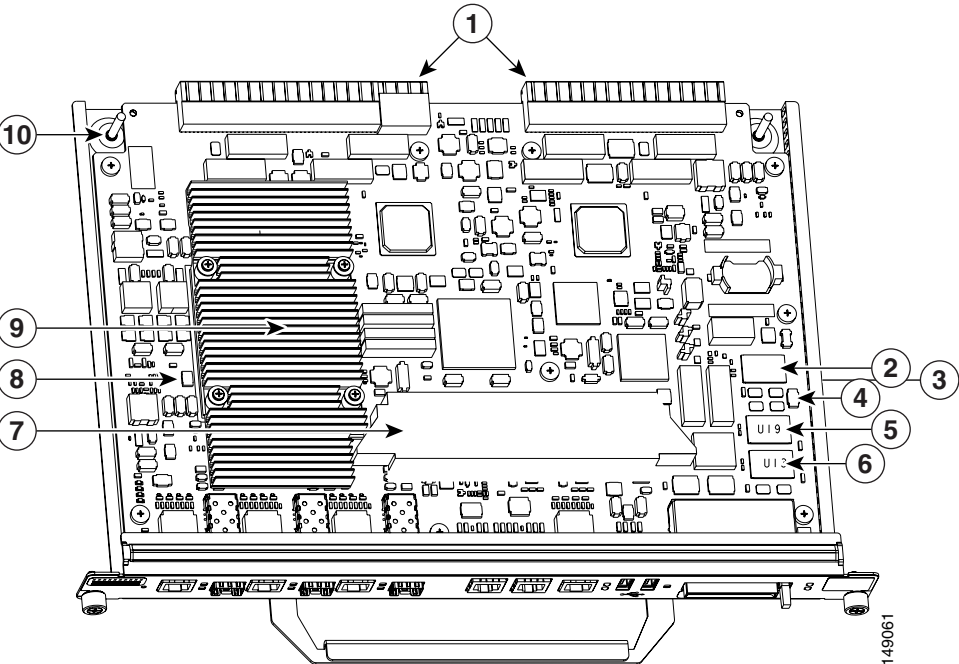
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Figure 1-5 NPE-G2



	10	

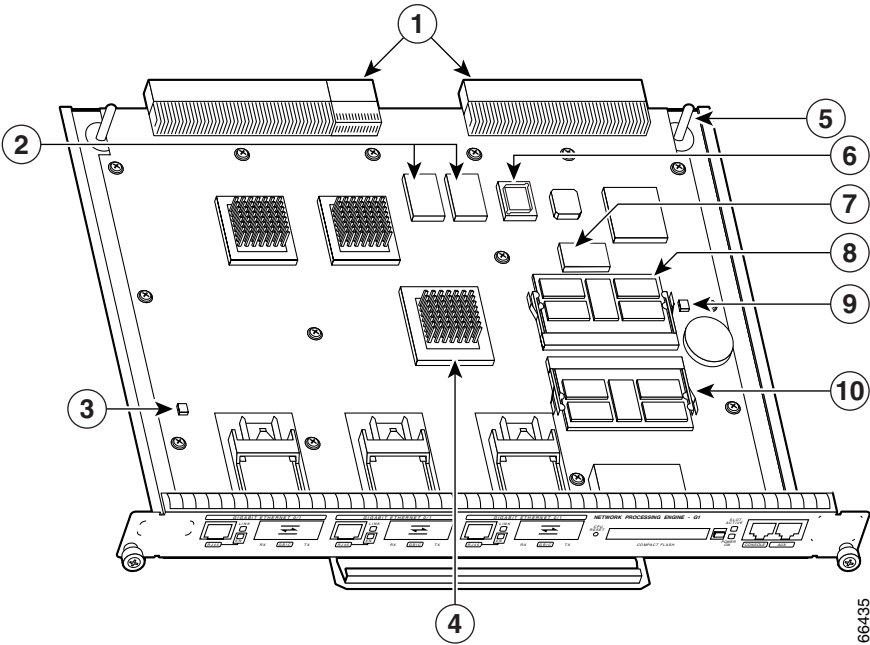
Table 1-2 NPE-G2 Memory Specifications

Memory Type	Size	Quantity	Description	Component Location on the NPE-G2 Board

Memory Type	Size	Quantity	Description	Component Location on the NPE-G2 Board

NPE-G2 SDRAM Configuration—Configurable Memory Only

Total SDRAM	SDRAM Bank	Quantity

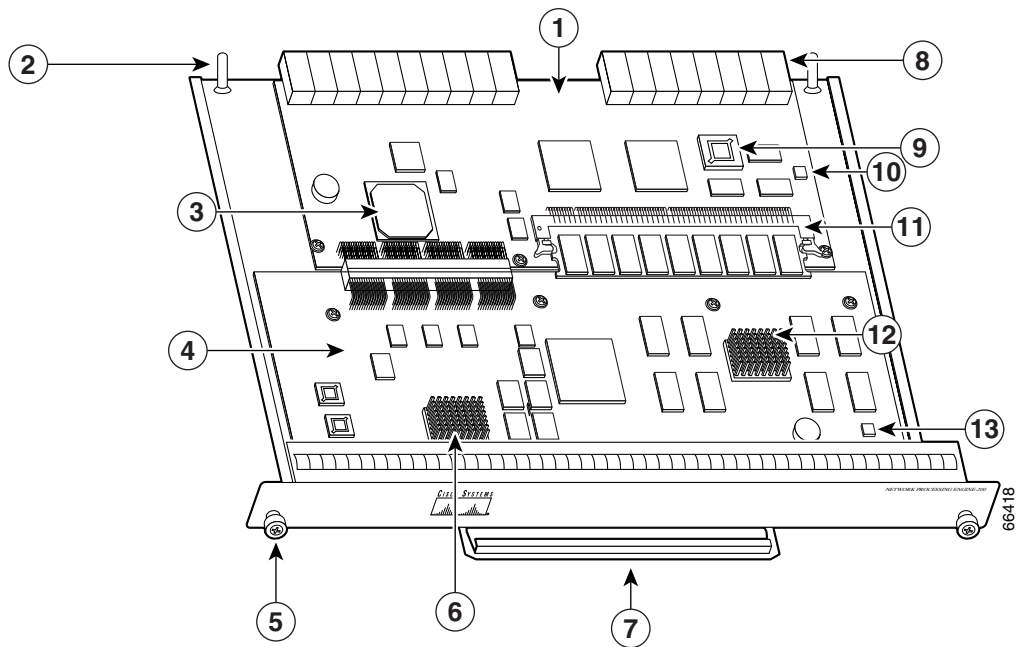


1		6	
2		7	
3		8	
4		9	
5		10	

Memory Type	Size	Quantity	Description	Component Location on the NPE-G1 Board

NPE-G1 SDRAM SODIMM Memory Configurations—Configurable Memory Only

Total SDRAM	SDRAM Bank	Quantity	Product Number



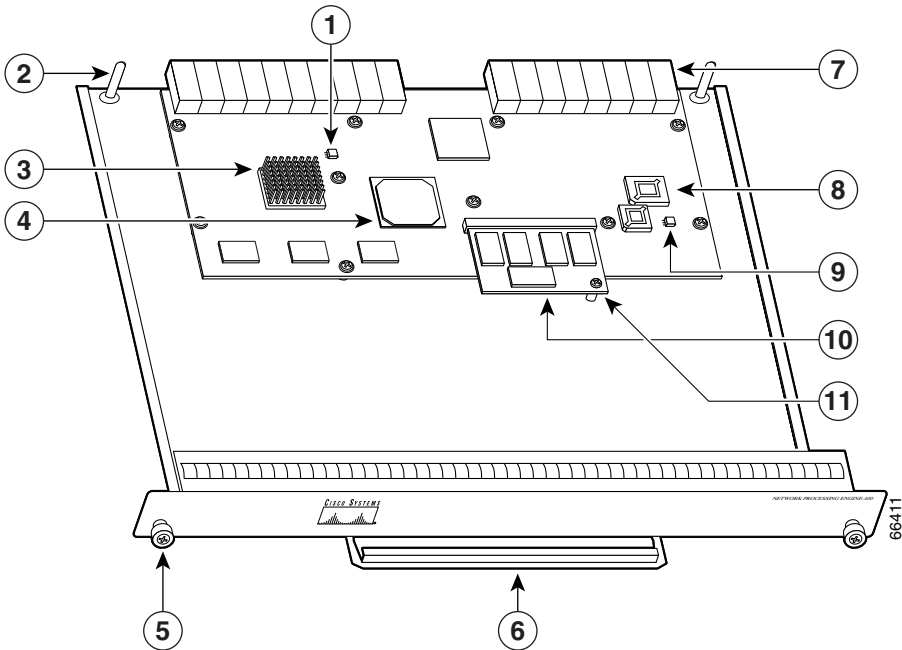
1		8	
2		9	
3		10	
4		11	
5		12	
6		13	
7			

Memory Type	Size	Quantity	Description	Location ¹

Location on processing engine board. See [Figure 1-7](#).

128 MB	U15	1 128-MB DIMM	MEM-SD-NPE-128MB=
256 MB	U15	1 256-MB DIMM	MEM-SD-NSE-256MB=

Figure 1-8 NPE-400



Temperature sensor (U31)	Midplane connector
Keying post	Boot ROM (U7)
RM7000 microprocessor	Temperature sensor
System controller	SODIMM (J1)
Captive installation screw	Standoff and screw
Handle	

Table 1-8 lists the NPE-400 memory specifications, and Table 1-9 lists factory-installed SDRAM configurations and their product numbers.

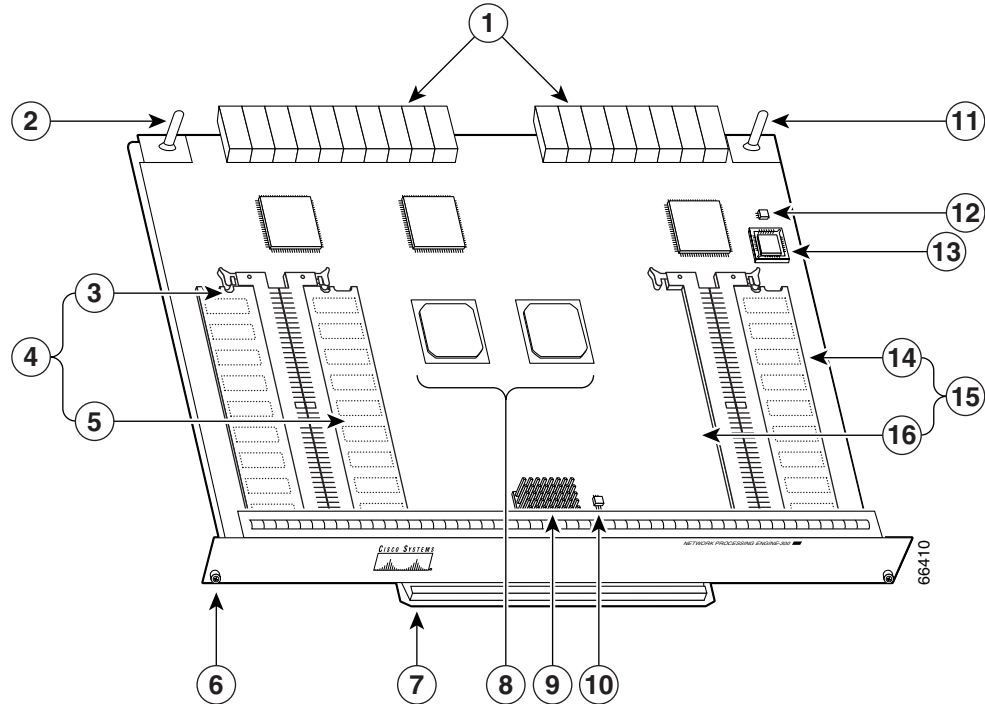
SDRAM-configurable	128, 256, or 512 MB	1	128-, 256-, or 512-MB SODIMM	J1
Boot ROM	512 KB	1	OTP ¹ ROM for the ROM monitor program	U7
Primary cache	16 KB (instruction), 16 KB (data)	—	RM7000 processor, integrated cache	U38
Secondary cache	256 KB (fixed)	—	RM7000 processor, unified, internal cache	U38
Tertiary cache	4 MB (fixed)	—	RM7000 processor, external cache	U2, U26, U27, U28, U37

1. OTP = one-time programmable

Table 1-9 NPE-400 SDRAM SODIMM Memory Configurations

128 MB	J1	1 128-MB SODIMM	MEM-NPE-400-128MB=
256 MB	J1	1 256-MB SODIMM	MEM-NPE-400-256MB=
512 MB	J1	1 512 MB SODIMM	MEM-NPE-400-512MB=

Figure 1-9 NPE-300



Midplane connectors	RM7000 microprocessor
Keying post	Temperature sensor (U42)
DIMM 3 (U44)	Keying post
Bank 1 (user configurable)	Temperature sensor
DIMM 2 (U45)	Boot ROM (U1)
Captive installation screw	DIMM 0 (U16)
Handle	Bank 0 (fixed size)
System controllers	U15 never populated

Table 1-10 lists the NPE-300 memory specifications, and Table 1-11 lists factory-installed SDRAM configurations and their product numbers.

Table 1-10 NPE-300 Memory Specifications

SDRAM	32 to 256 MB	1 configurable ² bank with 2 SDRAM slots	32-, 64-, or 128-MB DIMMs (based on maximum SDRAM required)	Bank 1: U45 and U44 ³
Boot ROM	512 KB	1	OTP ⁴ ROM for the ROM monitor program	Socket U1
Primary cache	16 KB (instruction), 16 KB (data)	—	RM7000 processor, internal cache	U49

Secondary cache	256 KB	—	RM7000 processor, internal, unified instruction and data cache	U49
Tertiary cache	2 MB (fixed)	—	RM7000 processor, external cache	U7, U8, U9, U10, U17

1. Location on processing engine board. See [Figure 1-9](#).
2. Bank 0 is used exclusively for packet memory and is not user configurable.
3. Bank 1 contains the Cisco IOS software, processor memory, and packet memory.
4. OTP = one-time programmable

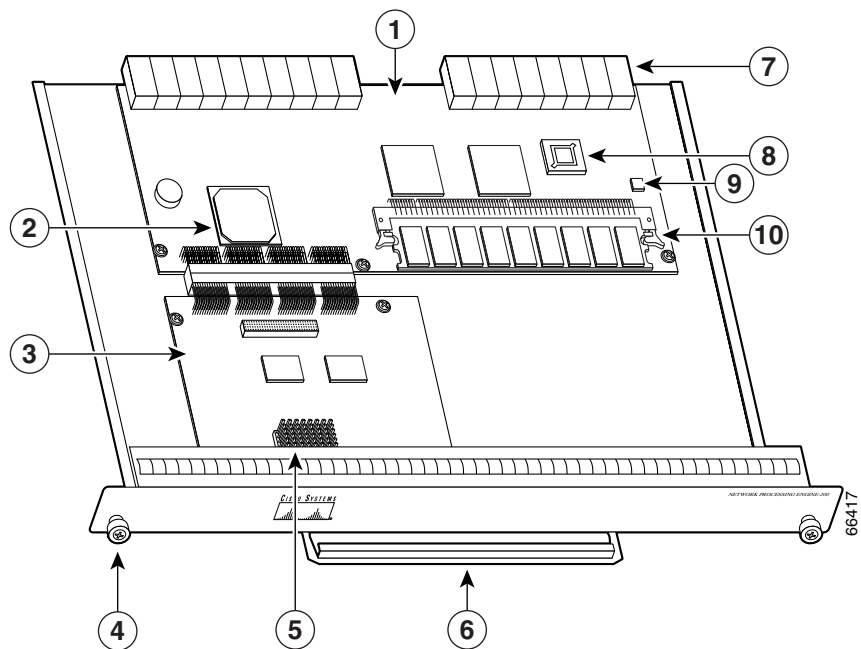


The NPE-300 contains two banks of SDRAM. Both SDRAM banks are used for all packet memory requirements; however, bank 0 is used exclusively for packet memory and is set at a fixed configuration in the factory.

Bank 1 contains two user-configurable SDRAM slots, DIMM slot 2 and DIMM slot 3 (see [Figure 1-9](#)). Both slots in bank 1 can be populated by DIMMs of different sizes; however, the size of the DIMM in slot 2 must be greater than or equal to the size of the DIMM in slot 3, and the size of the DIMM in slot 3 can be zero.

			2
32 ³ MB + 32 MB	U45 (DIMM slot 2 only)	1 32-MB DIMM	MEM-SD-NPE-32MB=
32 ³ MB + 64 MB	U45 and U44 or U45	2 32-MB DIMMs or 1 64-MB DIMM	MEM-SD-NPE-32MB= MEM-SD-NPE-64MB=
32 ³ MB + 128 MB	U45 and U44 or U45	2 64-MB DIMMs or 1 128-MB DIMM	MEM-SD-NPE-64MB= MEM-SD-NPE-128MB=
32 ³ MB + 256 MB	U45 and U44	2 128-MB DIMMs	MEM-SD-NPE-128MB=

1. There are two user-upgradable SDRAM slots in bank 1. (Bank 0 is used exclusively for packet memory and is set at a fixed configuration in the factory.)
2. These products are also available as SDRAM upgrades. To order an upgrade, add an equal sign (=) after the product number, for example, MEM-SD-NPE-128MB=.
3. This 32 MB is fixed memory in SDRAM bank 0, socket U16. Socket U15 is never populated.



Network controller board	Handle
System controller	Midplane connectors
Processor engine board	Boot ROM (U1)
Captive installation screw	Temperature sensor
RM5271 microprocessor	SDRAM DIMM (U15)

[Table 1-12](#) lists the NPE-225 memory specifications, and [Table 1-13](#) lists factory-installed SDRAM configurations and their product numbers.

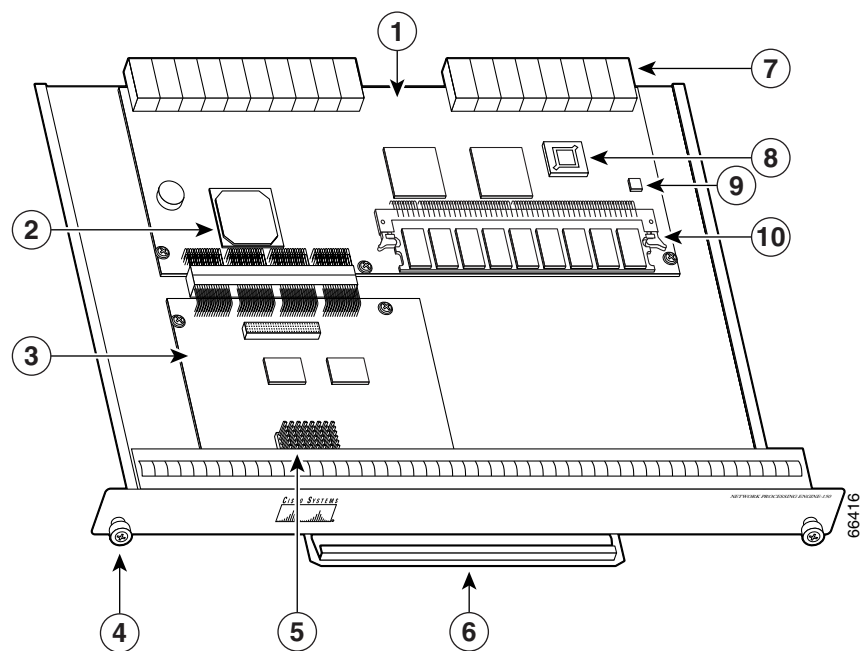








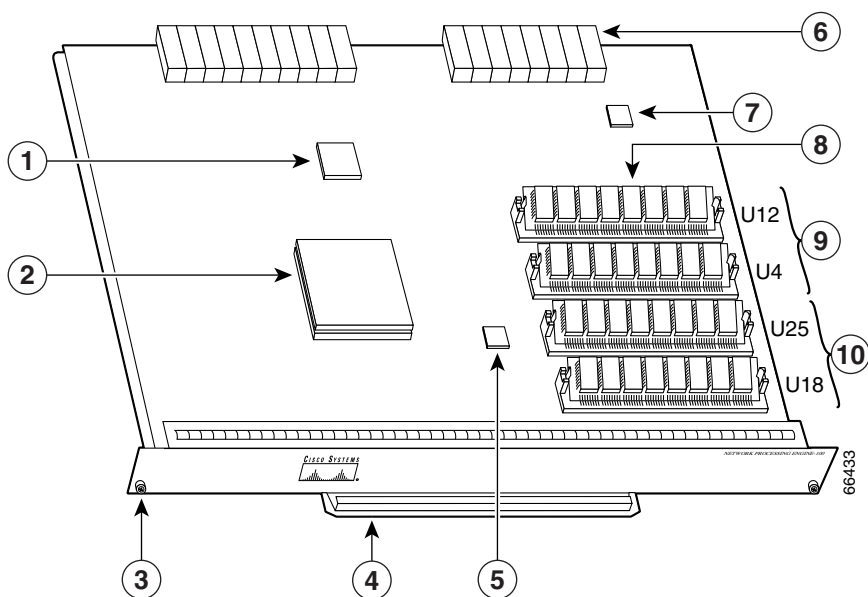














show version

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-JS-M),
Released Version 12.2(20011220:181136) [biff]
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 21-Dec-01 05:58 by
Image text-base:0x600089B8, data-base:0x6196E000

ROM: System Bootstrap, Version 12.2(20011219:132854)

(display text omitted)

cisco 7206VXR (NPE-G1) processor (revision 0x00) with 245760K/16384K bytes of memory.
Processor board ID 13250983
BCM12500 CPU at 500Mhz, Implementation 1, Rev 0.1, 512KB L2 Cache
6 slot VXR midplane, Version 2.0
```

Input/Output Controller


Note

Input/Output Controller Replacement Instructions

I/O Controller Descriptions

	1 Fast Ethernet port; equipped with an MII receptacle and an RJ-45 receptacle for use at 100 Mbps full-duplex or half-duplex operation. Only 1 receptacle can be configured for use at a time. (See Figure 1-17.)
C7200-I/O	Has no Fast Ethernet port. (See Figure 1-19.)
C7200-I/O-FE-MII ²	1 Fast Ethernet port; equipped with a single MII receptacle. (See Figure 1-21.)

- The Product Number C7200-I/O-FE does not specify MII because both an MII and an RJ-45 receptacle are included.
2. The I/O controller with the Product Number C7200-I/O-FE-MII has a single MII Fast Ethernet receptacle only. Although still supported by Cisco Systems, this I/O controller with a single MII receptacle is no longer an orderable product as of May 1998.

show diag slot 0



C7200-I/O-GE+E—With GBIC Gigabit Ethernet and RJ-45 Ethernet Receptacles

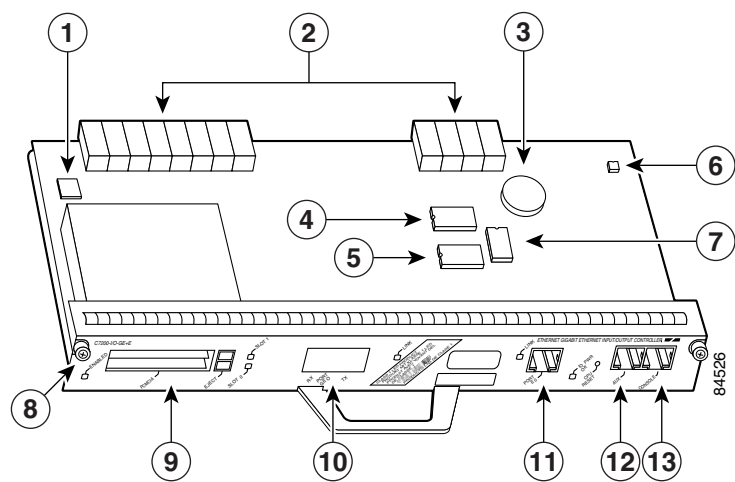


Figure 1-16 C7200-I/O-2FE/E—With Two RJ-45 Ethernet/Fast Ethernet Receptacles

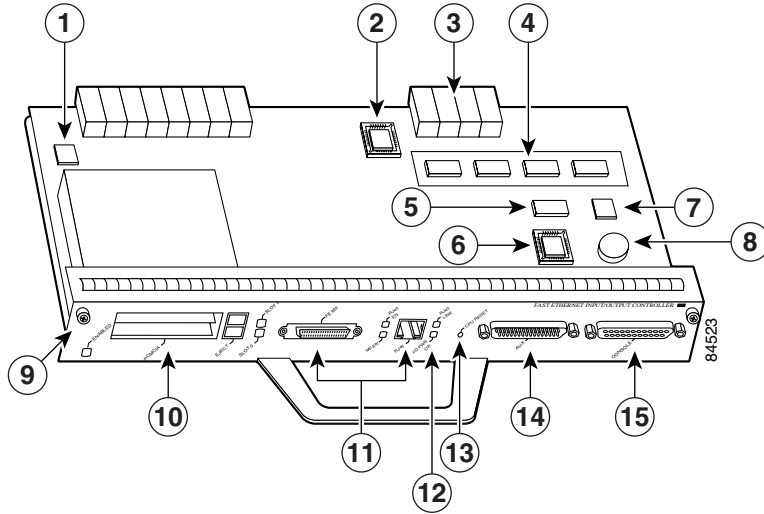
A detailed line drawing of a computer system unit, viewed from a three-quarter perspective. The unit is a horizontal chassis with a front panel and a top cover. Numbered callouts identify the following components:

- 1**: Points to the front panel, specifically the area around the floppy disk drive.
- 2**: Points to the top cover of the chassis.
- 3**: Points to the power supply unit, which is a rectangular box mounted inside the chassis.
- 4**: Points to the system board (motherboard) populated with various integrated circuits and components.
- 5**: Points to the RAM modules (random access memory) installed in slots on the system board.
- 6**: Points to the hard disk drive, which is a rectangular component mounted vertically inside the chassis.
- 7**: Points to the front panel connectors, including the power button, reset button, and indicator lights.
- 8**: Points to the 3.5-inch floppy disk drive located on the front panel.
- 9**: Points to the 5.25-inch floppy disk drive located on the front panel.
- 10**: Points to the parallel port connector on the front panel.
- 11**: Points to the serial port connector on the front panel.
- 12**: Points to the IDE (PATA) hard disk drive connector on the front panel.
- 13**: Points to the IDE (PATA) floppy disk drive connector on the front panel.

The front panel also features the text "FAST EMBROIDERED PORT/PORT/PORT CONTROLLER" and the model number "84531".

[illegible]

Figure 1-18 C7200-I/O-FE—With MII and RJ-45 Fast Ethernet Receptacles (Version 2)



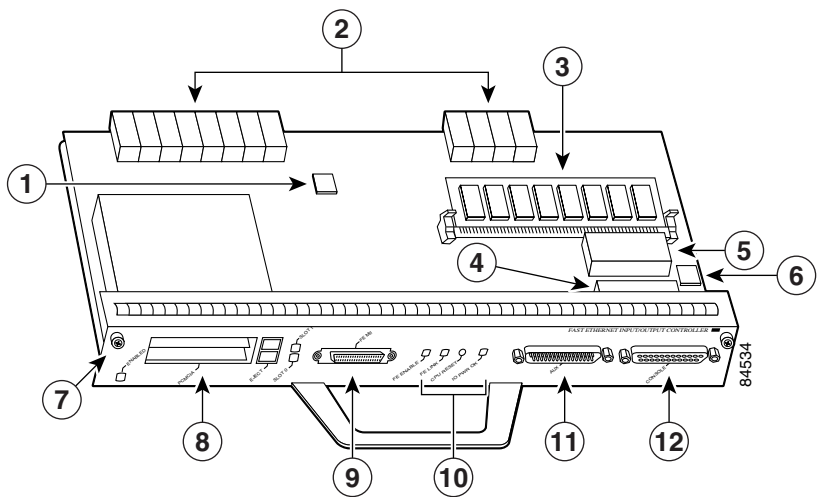


A detailed diagram of the 84524 Motherboard with numbered callouts (1-14) indicating the locations of various components. The components are as follows:

- 1: CPU
- 2: Cache
- 3: DRAM
- 4: AGP
- 5: IDE
- 6: Floppy
- 7: Parallel
- 8: Serial
- 9: Power
- 10: Keyboard
- 11: Mouse
- 12: PS/2
- 13: VGA
- 14: Audio

[illegible]

Figure 1-21 C7200-I/O-FE-MII— With Single MII Fast Ethernet Receptacle





Type	Size	Quantity	Memory Description	Model	Location
Flash memory	256 KB	1	32-pin DIP-type	C7200-I/O-FE-MII	U20
			32-pin DIP-type or 32-pin PLCC-type	C7200-I/O-FE, C7200-I/O	U20 or U4
	4 MB	1	Contains the default boot helper image	C7200-I/O-FE-MII	U99
				C7200-I/O-FE, C7200-I/O	U99 or U10, U11, U12, and U13 (soldered) ²
	8 MB	1		C7200-I/O-GE+E, C7200-I/O-2FE/E	U13 and U25 (soldered) ²
Flash memory card	16 or 20 MB	Up to 2	Contains the default Cisco IOS image	All models	PC Card slot 0 and slot 1
Flash Disk	32, 48, or 128 MB	Up to 2			
NVRAM	128 KB	1	Nonvolatile EPROM for the system configuration file	C7200-I/O-FE-MII	U41
				C7200-I/O-FE, C7200-I/O	U41 or U14 (soldered) ³
				C7200-I/O-GE+E, C7200-I/O-2FE/E	U19 (soldered) ³

The C7200-I/O-GE+E and C7200-I/O-2FE/E do not have a boot ROM component.

- Some I/O controllers have no Flash SIMM but use a permanently soldered 4-MB or 8-MB Flash memory chip instead. (For the location of the 4-MB Flash memory chip, see the [Figure 1-18](#) and [Figure 1-20](#). For the location of the 8-MB Flash memory chip, see [Figure 1-15](#) and [Figure 1-16](#).)
- The NVRAM on some I/O controllers is replaced by a 32-pin nonsocketed SRAM component that is soldered onto the card. The SRAM component is made to act like the NVRAM by the addition of some external components, one of which is a 1-inch (2.54-cm) button-type lithium battery.

LED Descriptions


Caution


Note

I/O Controller LEDs

LED	Color	Function

NPE-G2 LEDs

LED Label	LED	Color	Status in the Power Up State

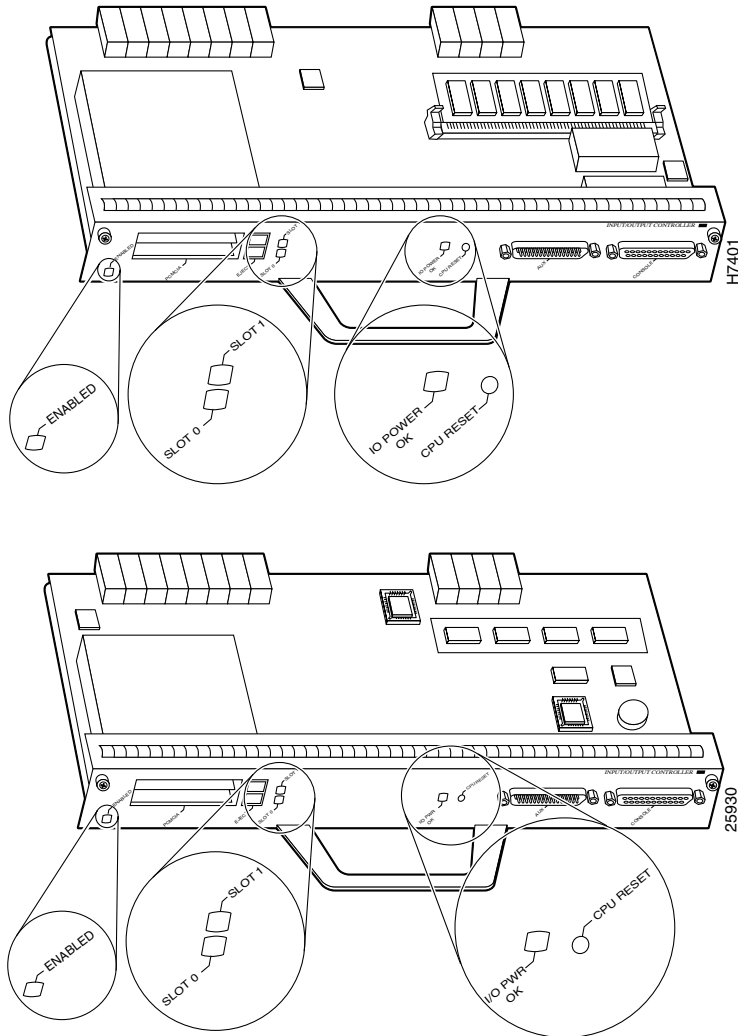
LED Label	LED	Color	Status in the Power Up State

NPE-G1 LEDs

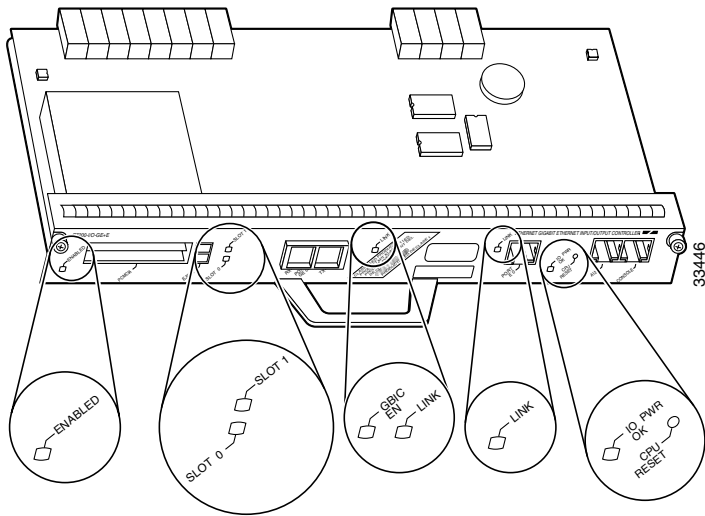
LED Label	LED	Color	LED Status in the Power Up State	LED Flashes when There Is Traffic
LINK, 0/1, 0/2, 0/3	RJ-45 and GBIC ports	Green		No
EN (Enable), 0/1, 0/2, 0/3	RJ-45 ports only	Green		
SLOT ACTIVE	CompactFlash Disk	Green	On when the slot is being used.	
POWER ON		Green	On and stays on.	

Input/Output Controller C7200-I/O LEDs

C7200-I/O LEDs and CPU Reset Button

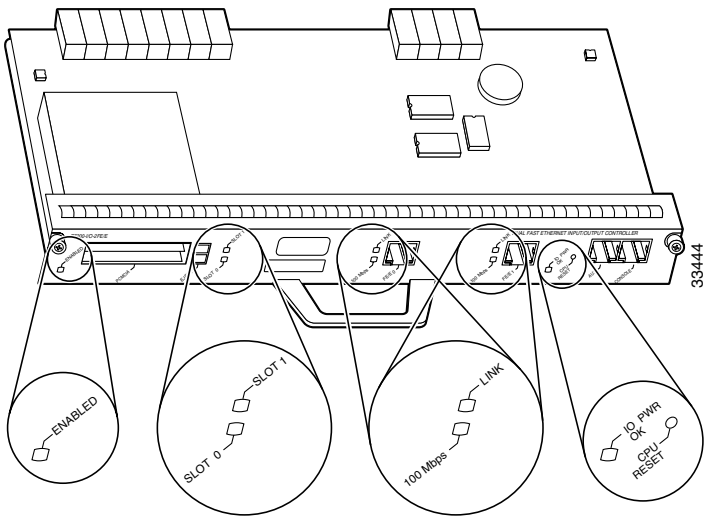


Input/Output Controller C7200-I/O-GE+E LEDs



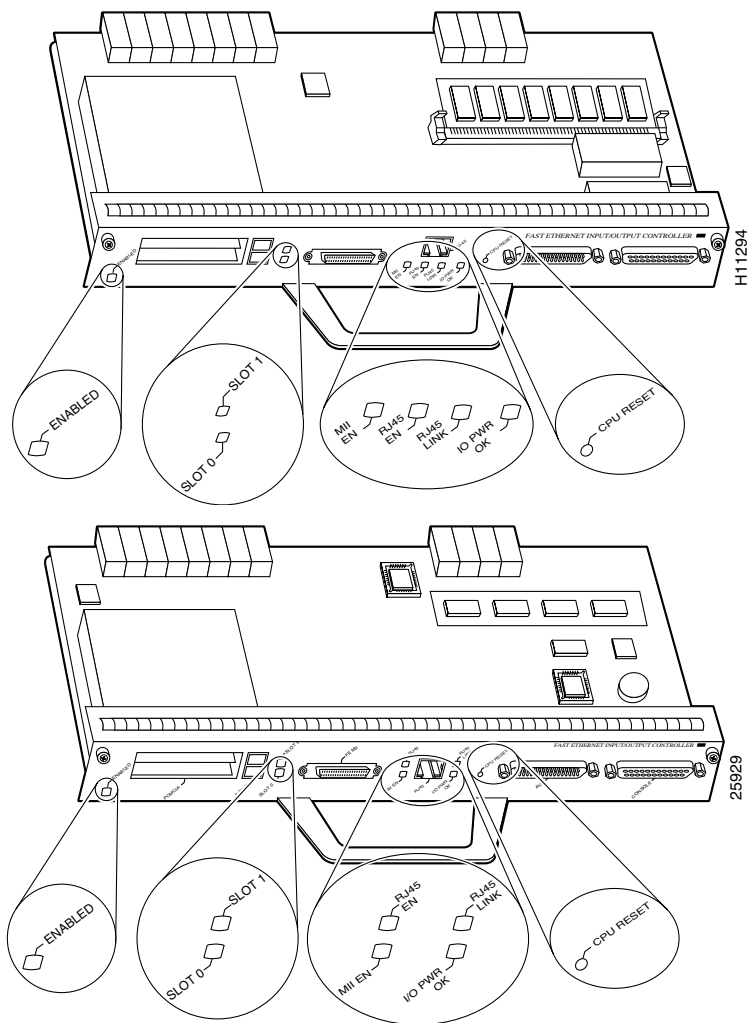
LED	Color	Function

Input/Output Controller C7200-I/O-2FE/E LEDs



LED	Color	Function
		Note

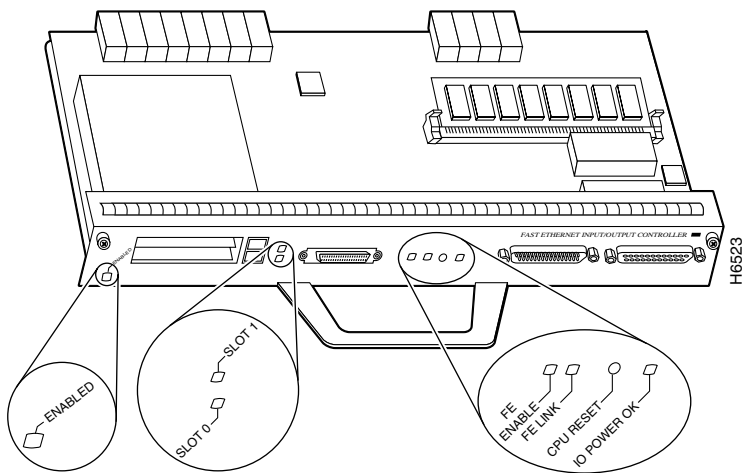
Input/Output Controller C7200-I/O-FE LEDs



LED	Color	Function


Note

Input/Output Controller C7200-I/O-FE-MII LEDs



LED	Color	Function

Port Adapters and Service Adapters


Note


Note

PA-4E Ethernet 10BaseT Port Adapter Installation and Configuration



Port Adapter Jacket Card

Port Adapter Jacket Card

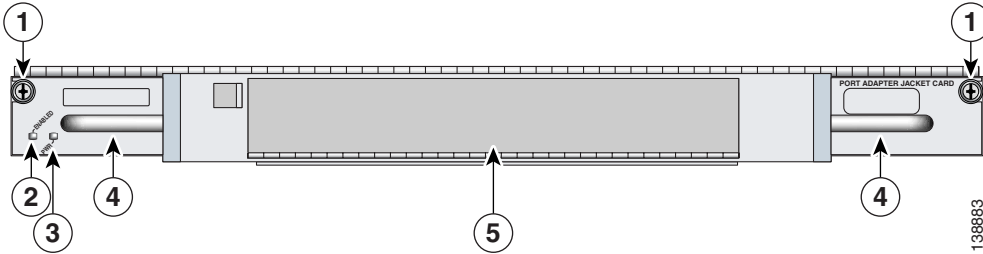




Figure 1-28 Cisco 7200 Series AC-Input Power Supply

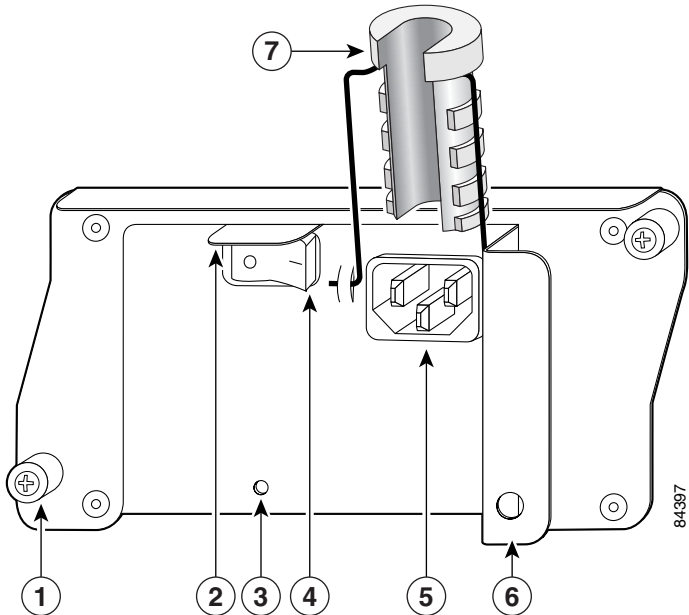
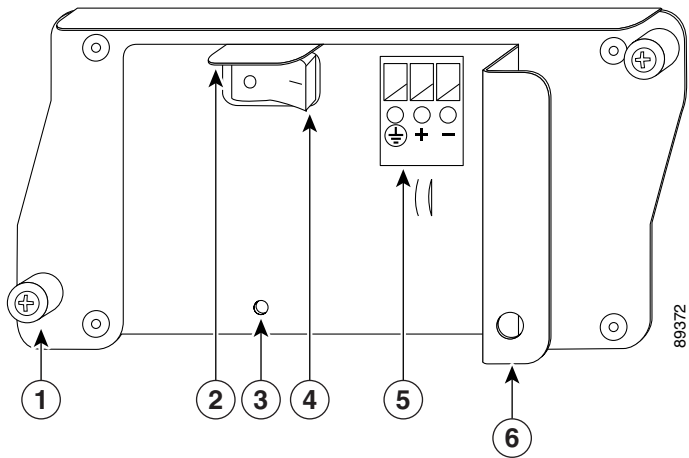
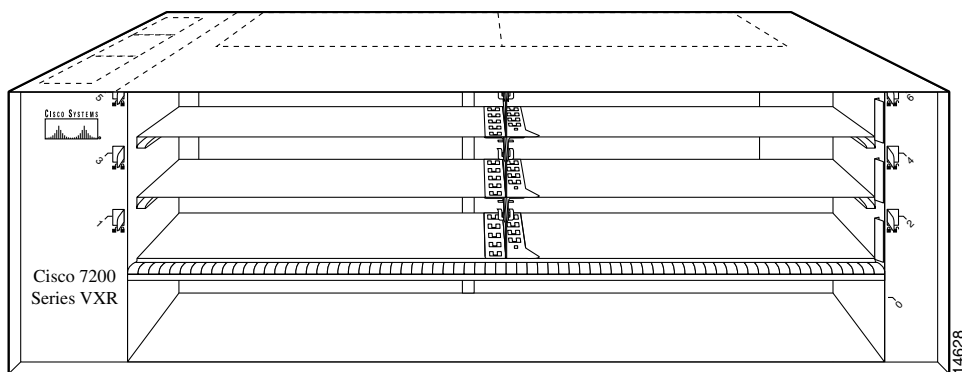


Figure 1-29 Cisco 7200 Series DC-Input Power Supply







CompactFlash Disks, Flash Disks, and PC Cards



Note



Note

the Flash Disk

Using

Memory Replacement Instructions for the Network Processing Engine or Network Services Engine and Input/Output Controller

Network Processing Engine or Network Services Engine Installation and Configuration

Memory Size	Product Number ¹

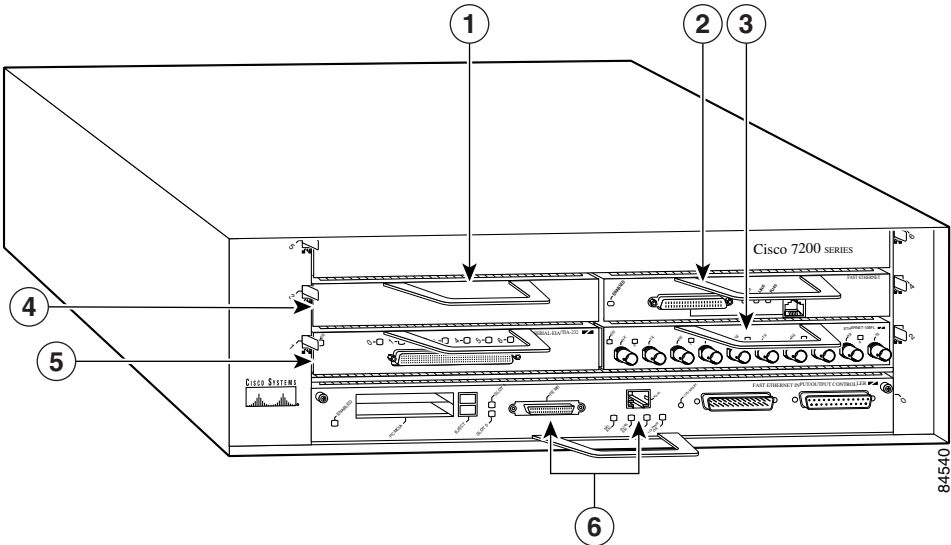
Memory Size	Product Number ¹

Memory Size	Product Number

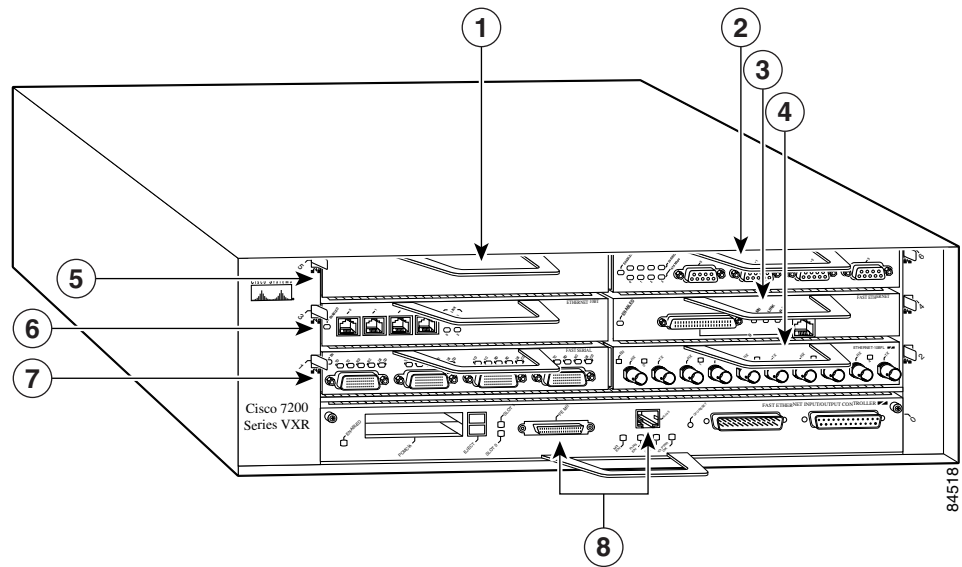
Rack-Mount and Cable-Management Kit

Functional Overview

Chassis Slot and Logical Interface Numbering



1		4	
2		5	
3		6	



1		5	
2		6	
3		7	
4		8	

show interfaces

```
Hardware is i82543 (Livengood), address is 0000.0000.0000 (bia 0000.0000.0000)
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
```

(display text omitted)

```
FastEthernet0/1 is administratively down, line protocol is down
Hardware is i82543 (Livengood), address is 0000.0000.0000 (bia 0000.0000.0000)
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
```

(display text omitted)

```
GigabitEthernet0/1 is up, line protocol is up
Hardware is BCM-12500 Internal MAC, address is 0000.0000.0000 (bia 0000.0000.0000)
Internet address is 00.00.00.00/00
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 2/255, rxload 2/255
```

(display text omitted)

```
GigabitEthernet0/2 is up, line protocol is up
Hardware is BCM-12500 Internal MAC, address is 0000.0000.0000 (bia 0000.0000.0000)
Internet address is 00.00.00.00/00
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 2/255, rxload 2/255
```

(display text omitted)

```
GigabitEthernet0/3 is administratively down, line protocol is down
Hardware is BCM-12500 Internal MAC, address is 0000.0000.0000 (bia 0000.0000.0000)
Internet address is 00.00.00.00/00
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
```

(display text omitted)

```
FastEthernet2/0 is administratively down, line protocol is down
Hardware is i82543 (Livengood), address is 0000.0000.0000 (bia 0000.0000.0000)
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
```

(display text omitted)

```
FastEthernet2/1 is administratively down, line protocol is down
Hardware is i82543 (Livengood), address is 0000.0000.0000 (bia 0000.0000.0000)
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
```

(display text omitted)

```
FastEthernet5/0 is up, line protocol is up
Hardware is DEC21140, address is 0000.0000.0000 (bia 0000.0000.0000)
Internet address is 00.00.00.00/00
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
```

Router# **show interface fastethernet 5/0**





- 1.
- 2.
- 3.

Environmental Monitoring and Reporting Functions

Environmental Monitoring

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NPE-G2 ¹	Low Warning	High Warning	Shutdown

NPE-G1 ¹	Low Warning	High Warning	Shutdown

Parameter	High Warning	High Critical	Shutdown
NPE-175, NPE-225, NPE-300, NPE-400, NSE-1			
NPE-100 or NPE-200			
NPE-150			



00:00:44:%ENVN-4-ENVWARN:+3.45 V measured at +3.57

Router (boot) #
00:04:49:%ENVN-4-ENVWARN:+5.15 V measured at +5.33



12.0(23), Cisco IOS Release 12.3(8), and Later Releases of Each



Reporting Functions

	show environment	show environment all	show environment last,	show environment
table				

**show environment****show environment**

```
show environment
```

```
show environment
```

show environment last

show environment last

show environment last

show environment table



show environment all

Power Supply 2 is ZyteK AC Power Supply. Unit is on.

Temperature readings:

chassis inlet measured at 26C/78F
chassis outlet 1 measured at 28C/82F
chassis outlet 2 measured at 29C/84F
chassis outlet 3 measured at 33C/91F

Voltage readings:

+3.45 V measured at +3.46 V
+5.15 V measured at +5.25 V
+12.15 V measured at +12.24 V
-11.95 V measured at -11.81 V

EnvM stats saved 138 time(s) since reload

Queued messages:

%ENVM-1-SHUTDOWN: Environmental Monitor initiated shutdown



Preparing for Installation

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Warning

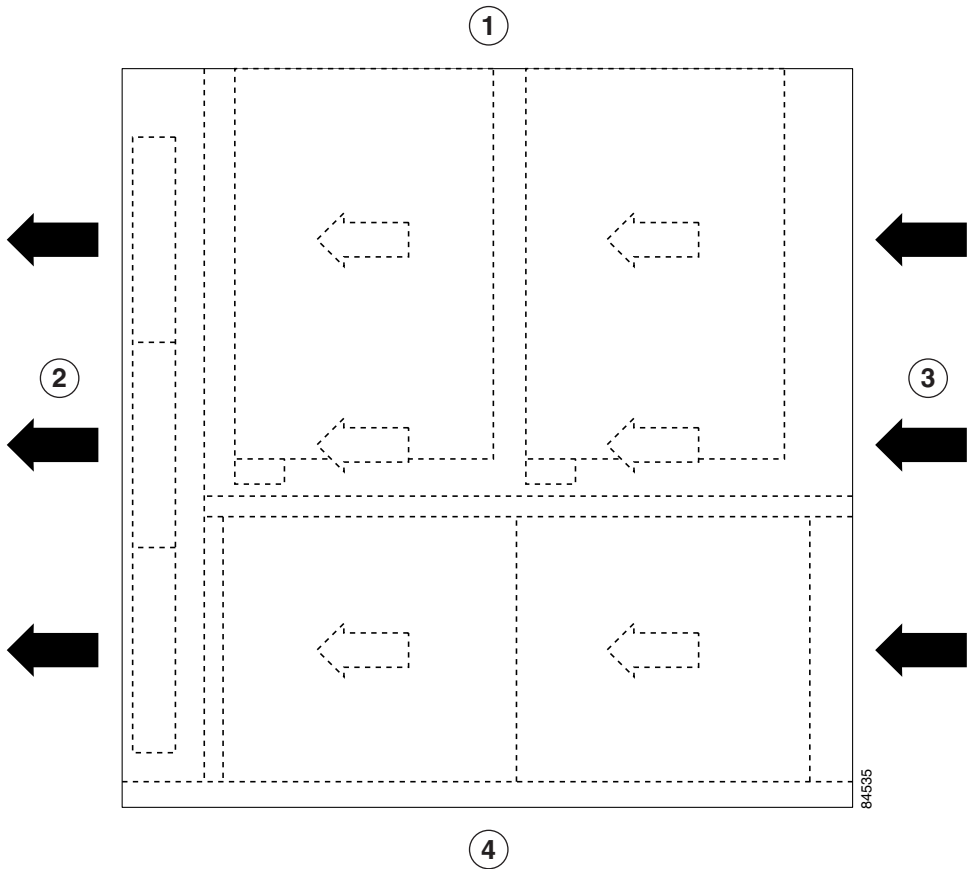
Before you install, operate, or service the system, read the “Site Preparation and Safety” section of the *Regulatory Compliance and Safety Information for the Cisco 7200 Series Routers*. This guide contains important safety information you should know before working with the system. Statement 200

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□

Site Requirement Guidelines



1		3	
2		4	

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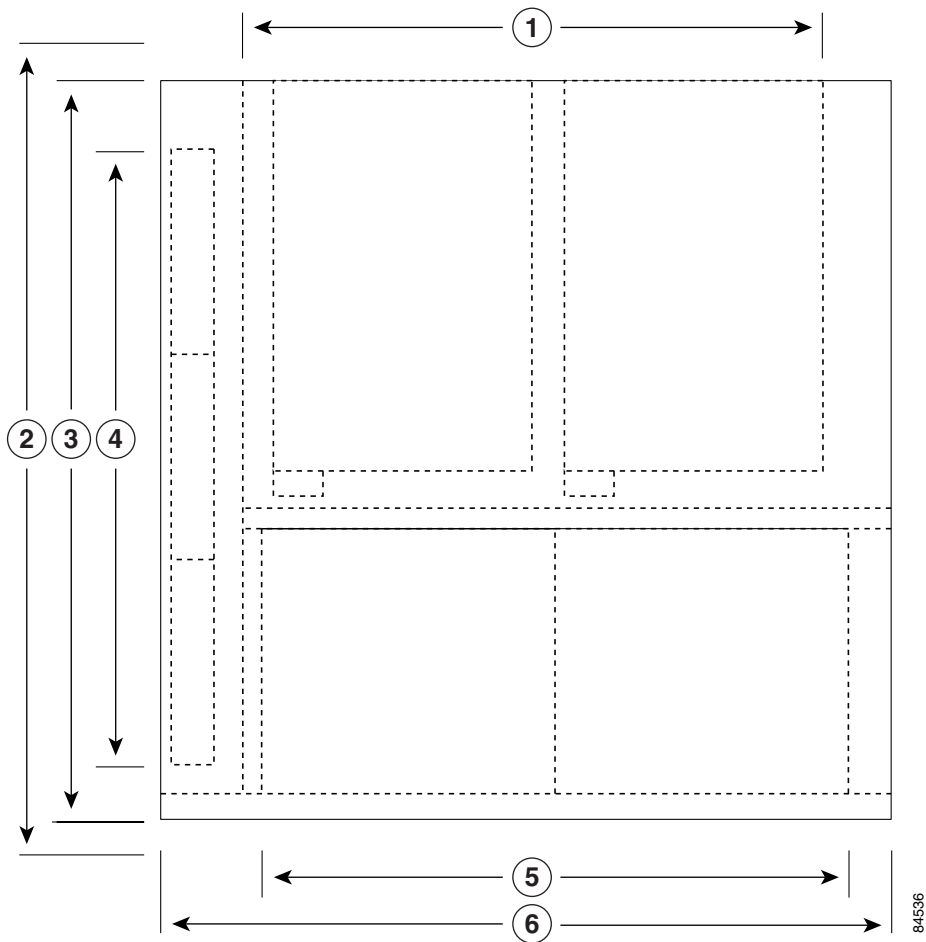
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Rack-Mounting Guidelines

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1		4	
2		5	
3		6	

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Caution

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Note

Temperature and Humidity Requirements

Specifications for Operating and Nonoperating Environments

Specification	Minimum	Maximum

Power Connection Guidelines

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Note

Plant Wiring Guidelines

Interference Considerations

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Note

Distance Limitations and Interface Specifications



Note

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Enhanced ATM Port Adapter Installation and Configuration

PA-A3

Initial Configuration Information

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- Zone names, network numbers, or node numbers for the new interfaces if required

Operating speeds for specific interfaces—for example, Token Ring interfaces operate at either 4 or 16 Mbps, and serial interfaces operate at speeds of up to 2 Mbps. The speed of an interface often depends on the speed of the remote device to which it is attached.

For complete configuration instructions, refer to the _____ and the _____, which are available on Cisco.com or on the Documentation DVD.

To assist you with your installation and to provide a historical record of what was done by whom, use the Cisco 7200 VXR Router Installation Checklist in [Table 2-2 on page 2-11](#). Make a copy of this checklist and indicate when each procedure or verification is completed. When the checklist is completed, place it in your site log (described at the end of this chapter) along with the other records for your new router.

Date router received		
Router and all accessories unpacked		
Types and numbers of interfaces verified		
Safety recommendations and guidelines reviewed		
Installation Checklist copied		
Site log established and background information entered		
Site power voltages verified		
Site environmental specifications verified		
Required passwords, IP addresses, device names, and so on, available		
Required tools available		
Network connection equipment available		
Router mounted in rack (optional)		
Cable-management brackets installed (optional but recommended)		
AC power cable(s) connected to AC source(s) and router; retention clip secured		
DC power cable(s) connected to DC source(s) and router		
Captive installation screws on I/O controller and network processing engine or network services engine checked		
Network interface cables and devices connected		
ASCII terminal attached to console port		
Console port set for 9600 baud, 8 data bits, no parity, and 2 stop bits (9600 8N2)		
System power turned on (DC OK LED is on)		
System boot complete (I/O controller enabled LED is on)		
I/O controller, network processing engine or network services engine, and all port adapters operational (enabled LEDs on the port adapters and the I/O controller are on)		
Correct hardware configuration displayed after system banner appears		
System ready for global and interface-specific configuration		

Once you receive your Cisco 7200 VXR router, use the following procedure to check the contents of the shipping container. Use the [Cisco 7200 VXR Component List](#) in [Table 2-3](#) to ensure you received all the components you ordered.



Do not discard the shipping container. You need the container if you move or ship the Cisco 7200 VXR router in the future.

Verify that the following are included in the shipping container (the accessories box might be separate):

- One Cisco 7200 VXR router, fully assembled (except the rack-mount and cable-management kit)

- One or more accessories boxes (some or all may be shipped separately)

Check the contents of the accessories box against the [Cisco 7200 VXR Component List](#) and the packing slip to verify that you received all listed equipment, which should include the following:

- One modular power cable for each AC-input power supply

- One rack-mount and cable-management kit (four brackets and 14 mounting screws)

- Optional equipment that you ordered, such as network interface cables, transceivers, or special connectors

- Cisco 7200 VXR router hardware and software documentation, if ordered



We no longer ship the entire router documentation set automatically with each system. You must specifically order the documentation as part of the sales order. If you ordered documentation and did not receive it, we will ship the documents to you within 24 hours. To order documents, contact a customer service representative.

Verify that the port adapters installed in your Cisco 7200 VXR router match the port adapter types on the packing list.

Proceed to the [“Site Log” section on page 2-13](#), and then to [Chapter 3, “Installing a Cisco 7200 VXR Router,”](#) to begin the installation.

Table 2-4 on page 2-14 shows a sample site log page. Make copies of the sample or design your own site log to meet the needs of your site and equipment.

[illegible]



Installing a Cisco 7200 VXR Router

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Note



Caution



Warning

Before you install, operate, or service the system, read the “Site Preparation and Safety” . This guide contains important safety information you should know before working with the system.

Rack-Mounting a Cisco 7200 VXR Router



Typical Four-Post Equipment Rack Posts and Mounting Strips

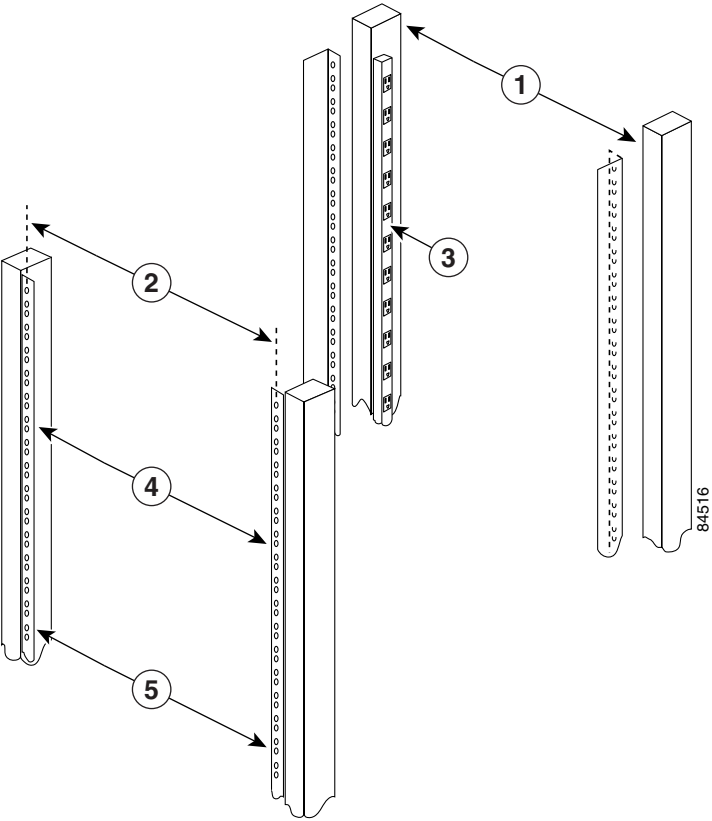
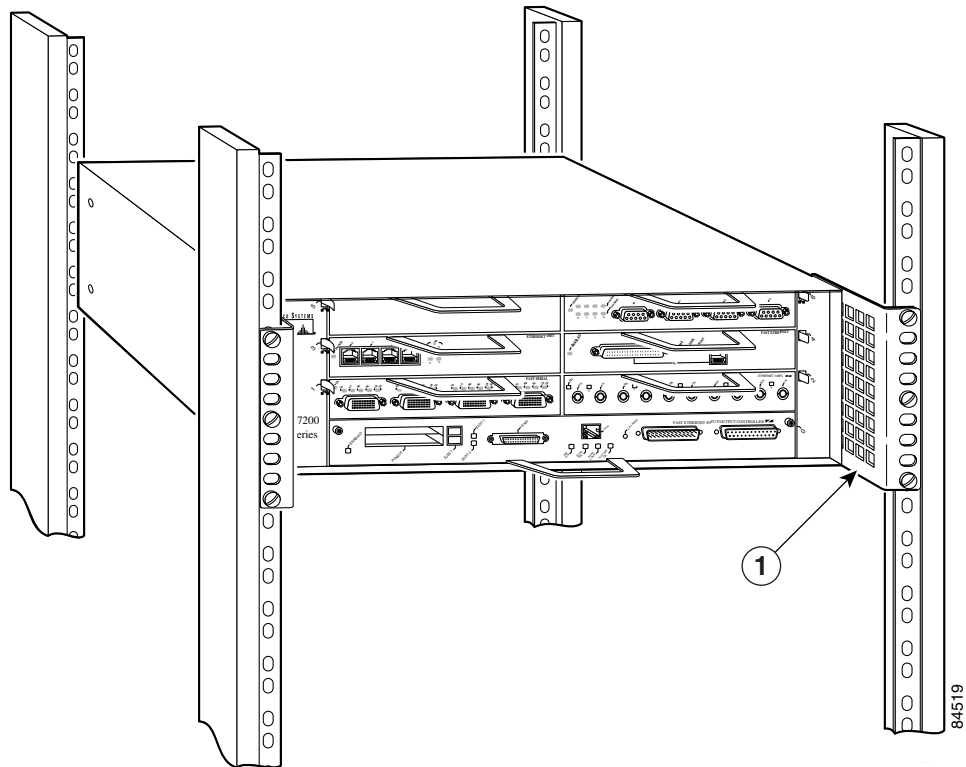
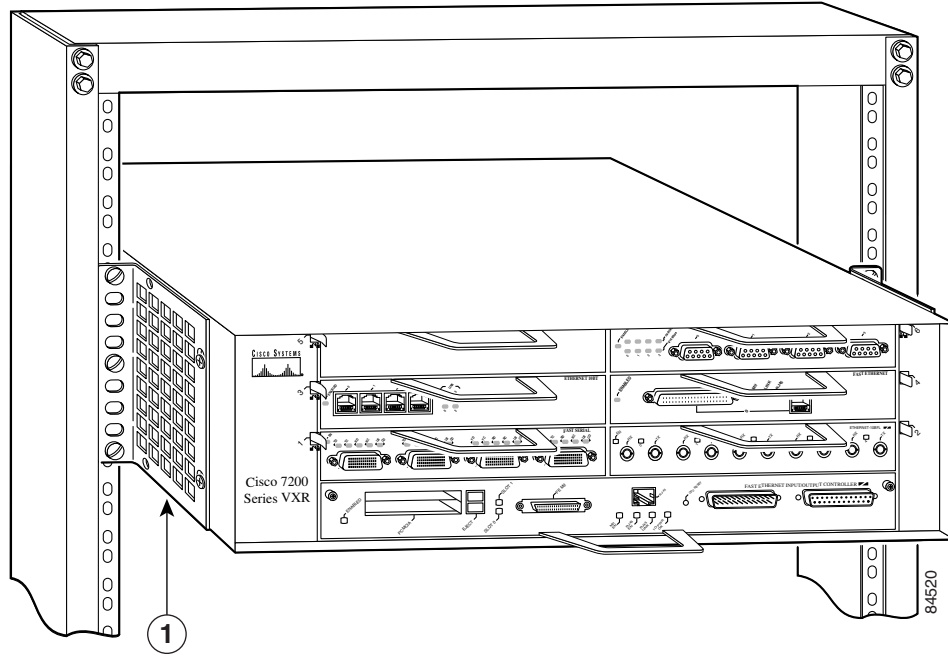
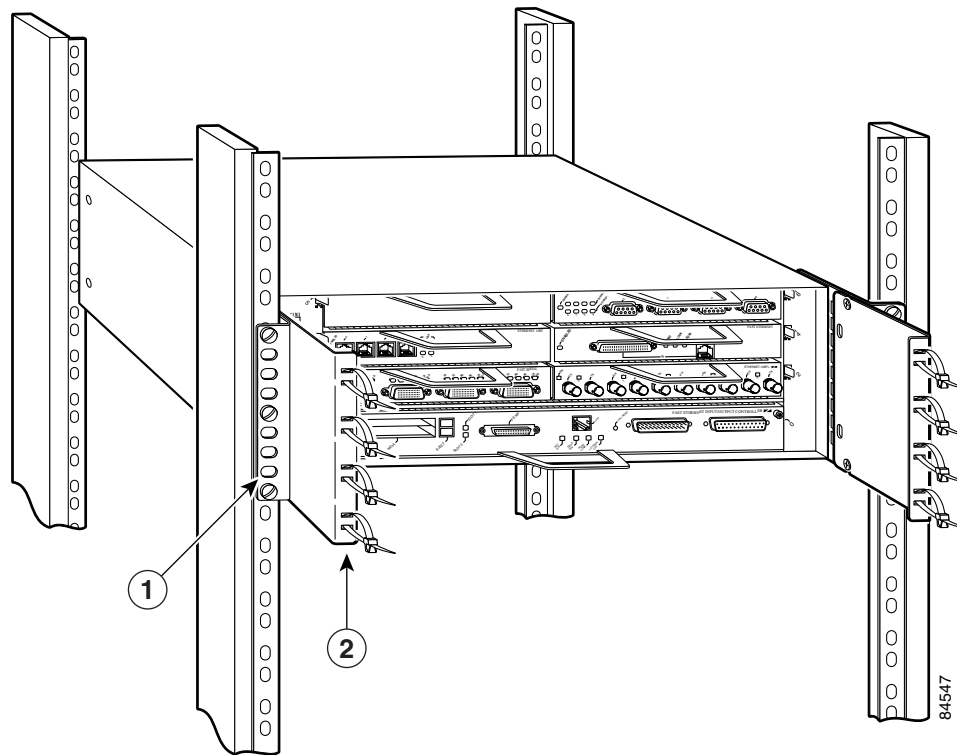


Figure 3-2 **Installing the Chassis in a Four-Post Rack—Front Installation Shown**







1

2

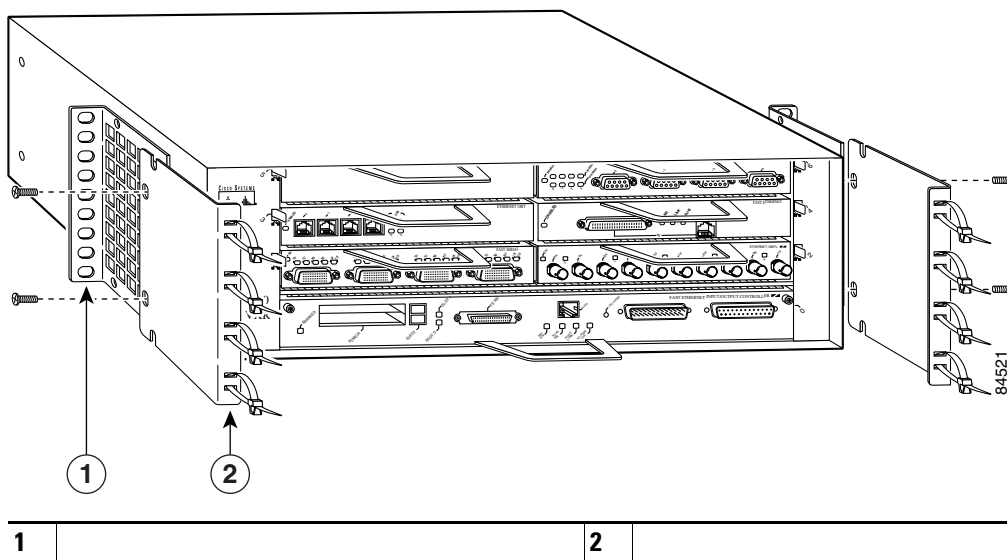
Attaching the Chassis Rack-Mount and Cable-Management Brackets

Installing the Brackets on the Front of the Chassis

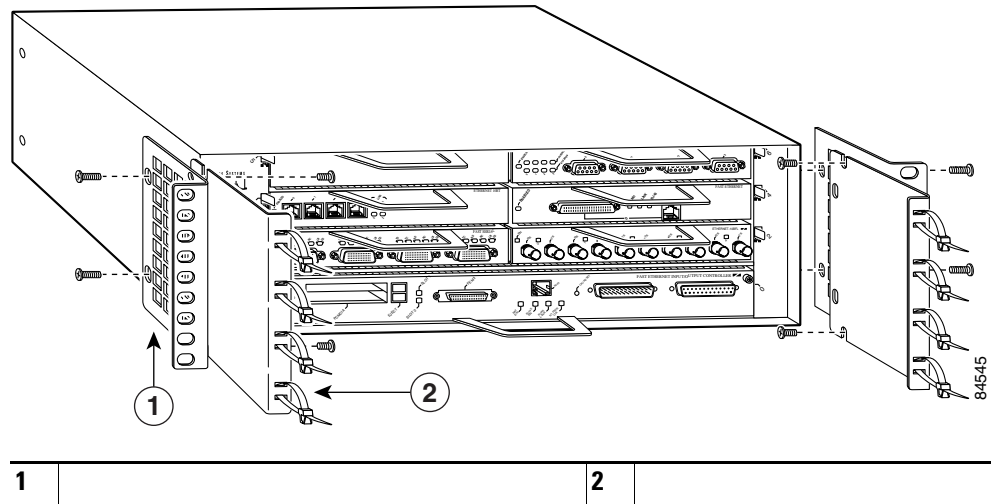
Step 1

Step 2

Step 3



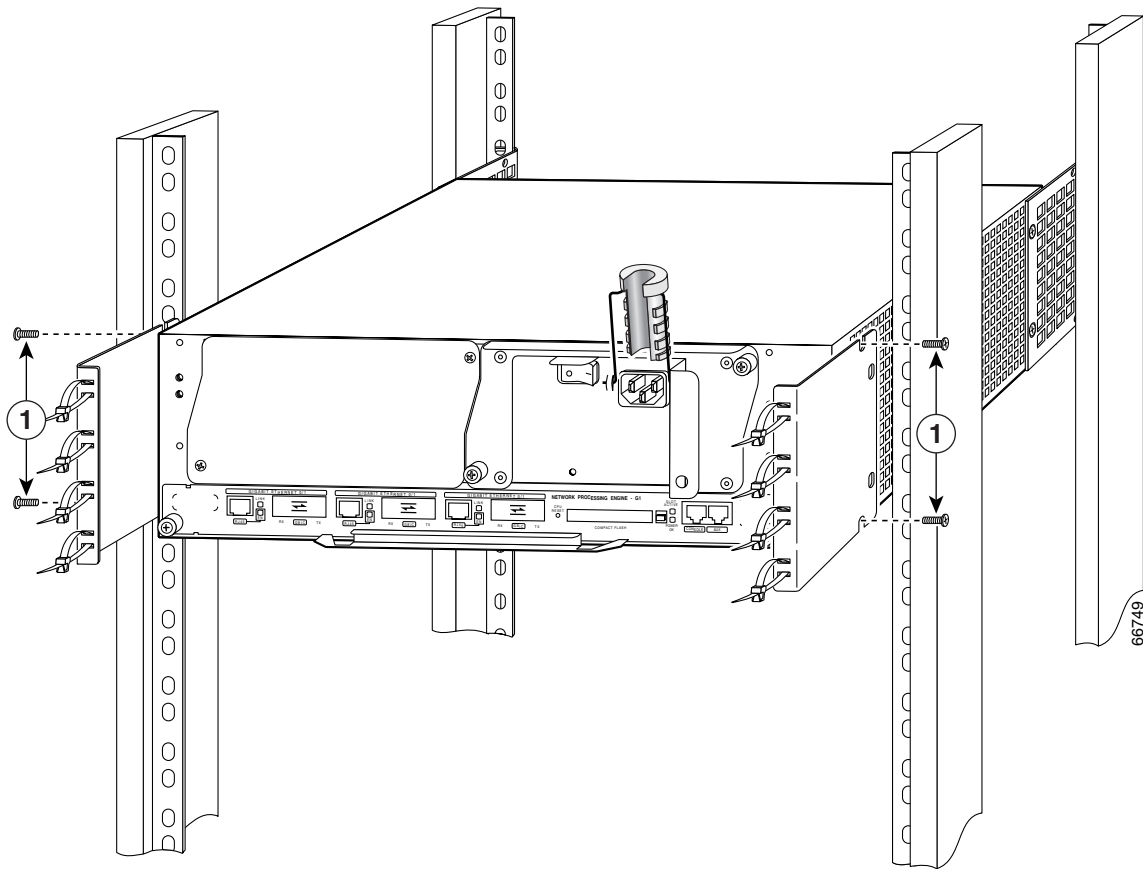
Step 4



Step 5

Installing the NPE-G1 and NPE-G2 Cable-Management Brackets on a Front-Mounted Router

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1

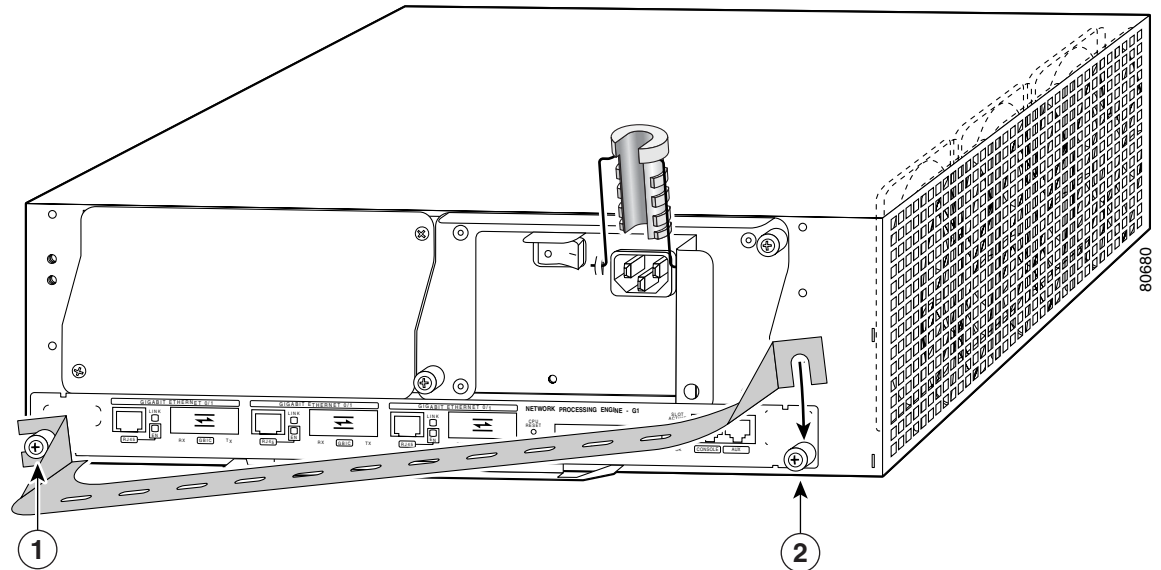
Step 1

Step 2

Step 3

Step 4

Installing the NPE-G1 and NPE-G2 Optical Cable-Management Bracket



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2

Step 1

Step 2

Step 3

Step 4

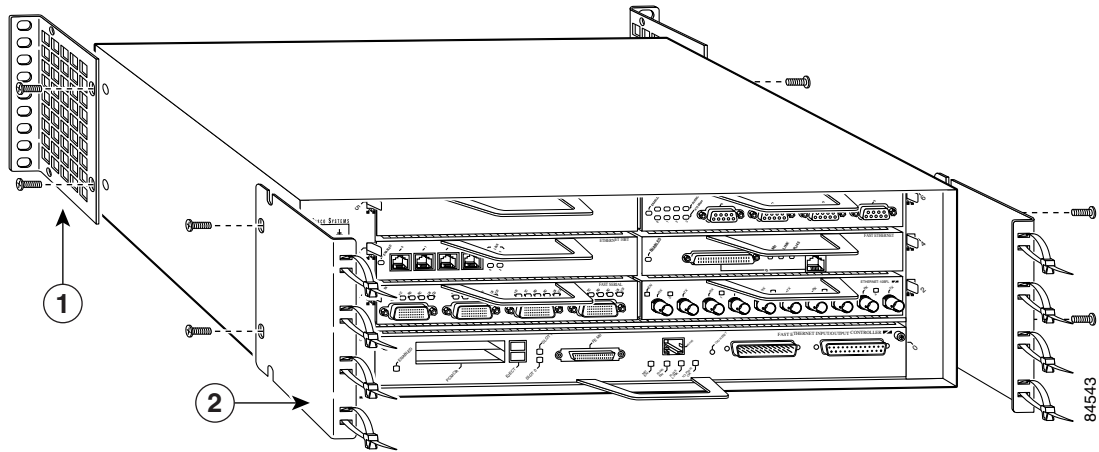
Step 5

Step 6

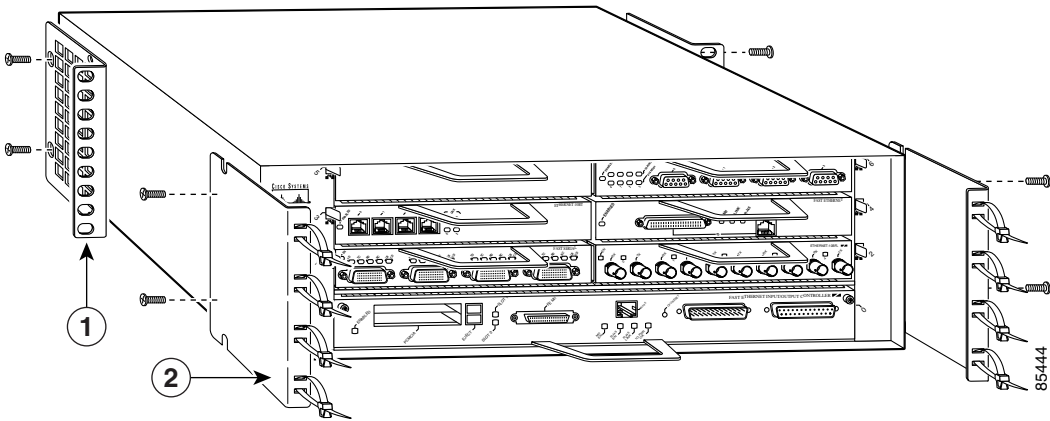
Installing the Brackets on the Rear of the Chassis

Step 1

Step 2



1	2
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1	2
---	---

Step 3

Step 4

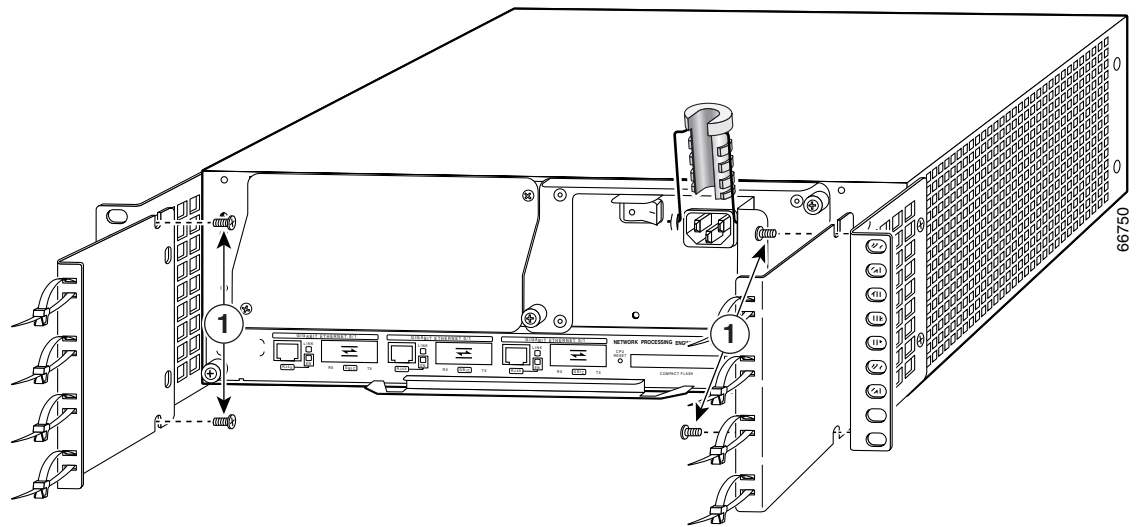
Step 5

Step 6

Step 7



Installing the NPE-G1 and NPE-G2 Cable-Management Brackets on a Rear-Mounted Router



1

Step 1

Step 2

Installing the Chassis in the Rack

Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

General Tabletop or Workbench Installation

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Note

Step 1

Step 2

Step 3

Step 4

Step 5

Installing the Cable-Management Brackets

Step 1

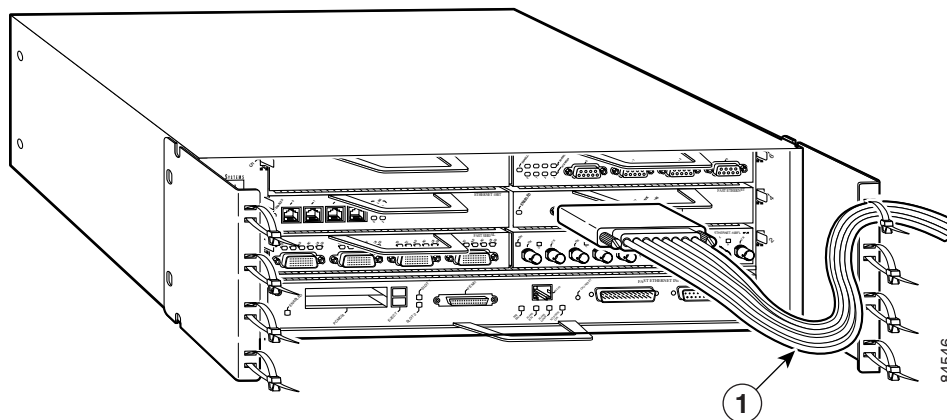
Step 2

Step 3

Step 4

**Note**

Securing the Port Adapter Cables

**Note****Step 1****Step 2****Note****Step 3****1**

Step 4

Attaching a Chassis Ground Connection

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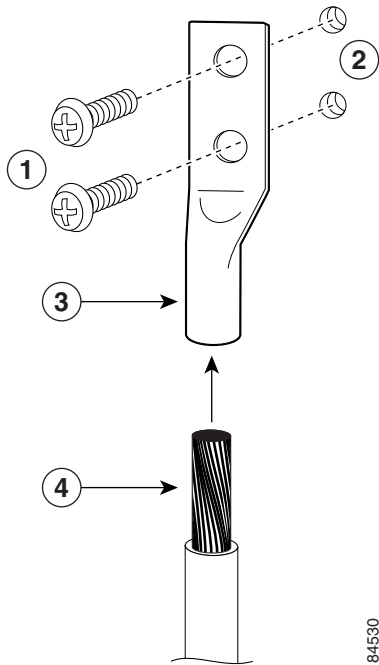
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Attaching a Chassis Ground Connection



1		3	
2		4	

Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

Step 7

Connecting Port Adapter Cables

Connecting I/O Controller, NPE-G1, or NPE-G2 Cables



Note

Connecting to Gigabit Ethernet Slots and Ports

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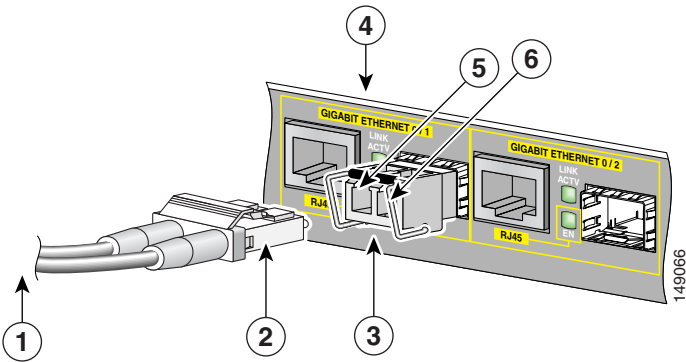
[Form-Factor Pluggable \(SFP\) GBIC Module Installation Instructions and Specifications](#)

Gigabit Ethernet SFP Module Connections



Warning Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures. Statement 70

CLASS 1 LASER PRODUCT
LASERPRODUKT DER KLASSE 1
PRODUIT LASER DE CLASSE 1
クラス1 レーザ 製品
PRODUCTO LASER CLASE 1



1		4	
2		5	
3		6	

Specification	Description

-
-
-



Note



Note



Note

SFP Module	Wavelength (nm)	Fiber Type	Core Size (microns)	Modal Bandwidth (MHz/km)	Cable Distance
			62.5 50.0 50.0	500 400 500	1804 ft (550 m) 1804 ft (550 m) 1804 ft (550 m)
		SMF	9/10	—	6.2 miles (10 km)
1000BASE-ZX SFP-GE-Z=	1550	SMF	9/10	—	43.5 miles (70 km)

A mode-conditioning patch cord is required. Using an ordinary patch cord with MMF, 1000BASE-LX/LH SFP modules, and a short link distance (tens of meters) can cause transceiver saturation resulting in an elevated bit error rate (BER). In addition, when using the LX/LH SFP module with 62.5-micron diameter MMF, you must install a mode-conditioning patch cord between the SFP module and the MMF cable on both the transmit and receive ends of the link. The mode-conditioning patch cord is required for link distances greater than 984 ft (300 m).

SFP Module	Transmit Power		Receive Power		Power Budget
	Minimum	Maximum	Minimum	Maximum	
SFP-GE-S=	-9.5 dBm ¹	-4 dBm ¹	-17 dBm	0 dBm	7.5 dBm ²
SFP-GE-L=	-9.5 dBm ³ -11.5dBm ⁴	-3 dBm ⁵	-20 dBm	-3 dBm	7.5 dBm ⁶ and 8.0 dBm ⁷
SFP-GE-Z=	0 dBm	5 dBm	-23 dBm	0 dBm	-24 dBm

- For fiber types 50/125 μm , NA = 0.20 fiber and 62.5/125 μm , NA = 0.275 fiber.
- For fiber types 50/125 μm MMF and 62.5/125 μm MMF.
- For fiber types 9/125 μm SMF.
- For fiber types 62.5/125 μm MMF and 50/125 μm MMF.
- For fiber types 9/125 μm SMF, 62.5/125 μm MMF, and 50/125 μm MMF.
- For fiber types 50/125 μm MMF and 62.5/125 μm MMF.
- For fiber type 10 μm SMF.

CWDM Product Number	Color
CWDM-SFP-1470	Gray
CWDM-SFP-1490	Violet
CWDM-SFP-1510	Blue
CWDM-SFP-1530	Green
CWDM-SFP-1550	Yellow
CWDM-SFP-1570	Orange
CWDM-SFP-1590	Red
CWDM-SFP-1610	Brown

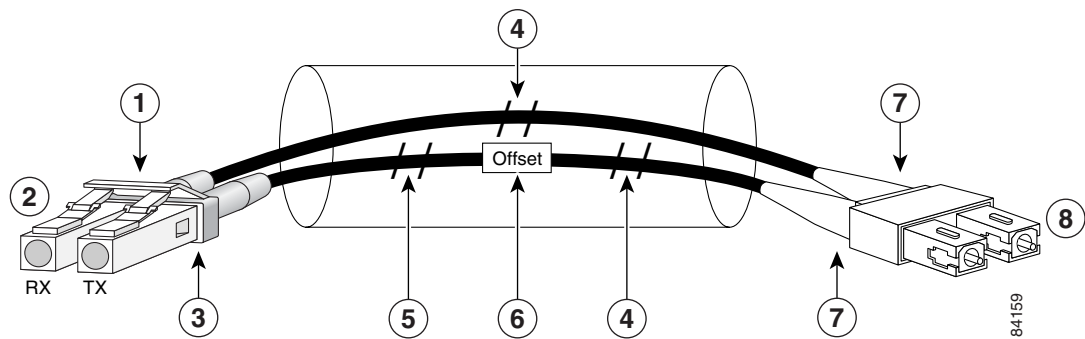
Mode-Conditioning Patch Cord Description

A mode-conditioning patch cord can be used with the SFP-GE-L= (SFP module) to allow reliable laser transmission between the single-mode laser source on the SFP module and a multimode optical fiber cable.

When an unconditioned laser source designed for operation on single-mode optical fiber is directly coupled to a multimode optical fiber cable, an effect known as [DMD](#) might result in a degradation of the modal bandwidth of the optical fiber cable.

This degradation results in a decrease in the link span (the distance between a transmitter and a receiver) that can be supported reliably. The effect of DMD can be overcome by conditioning the launch characteristics of a laser source. A practical means of performing this conditioning is to use a device called a mode-conditioning patch cord.

A mode-conditioning patch cord is an optical fiber cable assembly that consists of a pair of optical fibers terminated with connector hardware. Specifically, the mode-conditioning patch cord is composed of a single-mode optical fiber permanently coupled off-center (see Offset in [Figure 3-17](#)) to a graded-index multimode optical fiber. [Figure 3-17](#) shows a diagram of the mode-conditioning patch cord assembly.



1	Gray color identifier	5	Single-mode bar
2	To Gigabit Ethernet interface	6	Offset
3	Blue color identifier	7	Beige color identifier
4	Multimode bar	8	To cable plant

The mode-conditioning patch cord assembly is composed of duplex optical fibers, including a single-mode-to-multimode offset launch fiber connected to the transmitter, and a second conventional graded-index multimode optical fiber connected to the receiver. The use of a plug-to-plug patch cord maximizes the power budget of multimode 1000BASELX and 1000BASELH links.


Note

The mode-conditioning patch cord is required to comply with IEEE standards. The IEEE found that link distances could not be met with certain types of fiber-optic cable cores. The solution is to launch light from the laser at a precise offset from the center, which is accomplished by using the mode-conditioning patch cord. At the output of the patch cord, the SFP-GE-L= is compliant with the IEEE 802.3z standard for 1000BASELX.


Note

We strongly recommend cleaning optical fiber connections before attaching cables to equipment. See the [“Fiber-Optic Cleaning Information”](#) section on page 5-10 for information.

Gigabit Ethernet GBIC Connections

The Gigabit Interface Converter (GBIC) port is a 1000-Mbps optical interface in the form of an SC-type duplex port that supports IEEE 802.3z interfaces compliant with the 1000BASEX standard. (See [Figure 3-18](#).)


Note

The GBIC is a separately orderable part and does not ship installed in your I/O controller. You must install the GBIC before you connect the cables to it.

[Figure 3-18](#) shows the simplex and duplex SC-type connectors on your multimode or single-mode fiber-optic cables. For simplex connectors, two cables are required, one cable for transmit (TX) and a second cable for receive (RX). For duplex connectors, one cable that has both TX and RX connectors is required. You can use either simplex or duplex connectors for the C7200-I/O-GE+E or the NPE-G1.


Warning

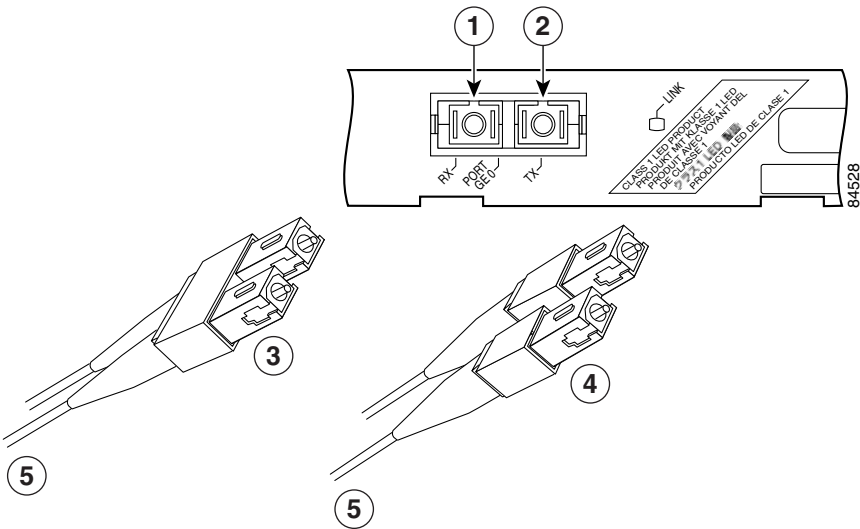
Because invisible laser radiation may be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to laser radiation and do not stare into open apertures.


Warning

Class 1 laser product. Statement 1008



Class 1 LED product.



1		4	
2		5	
3			

Gigabit Ethernet GBIC	Product Number

Product Number	GBIC	Description

GBIC Type	Gigabit Ethernet GBIC Product Number
	GBIC Product Number <ul style="list-style-type: none">
	CWDM GBIC Product Number <ul style="list-style-type: none">


Note

GBIC Cabling and Connection Equipment

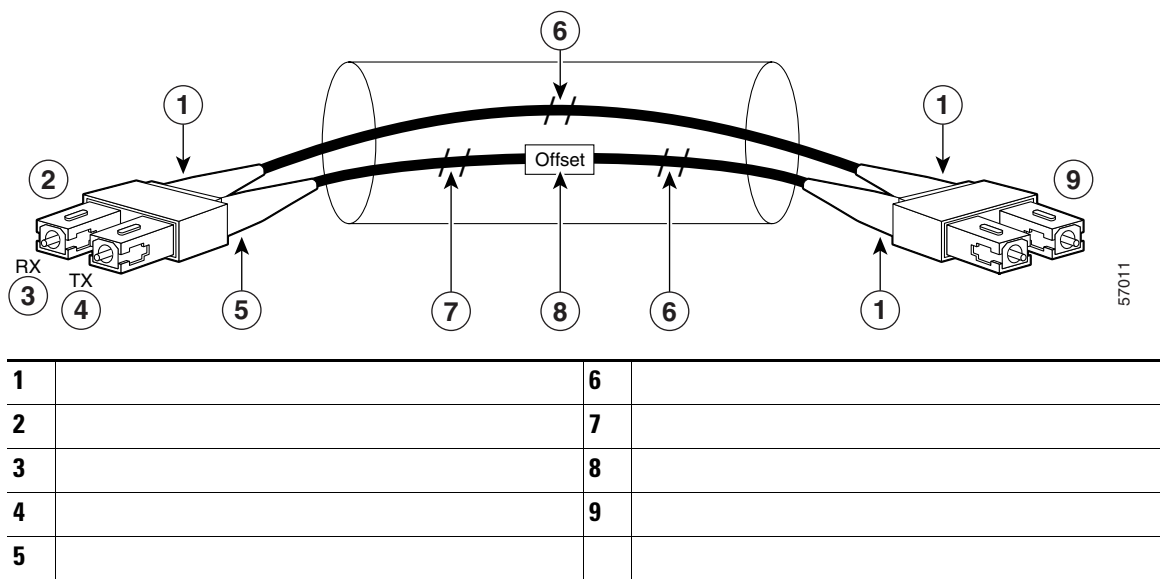
GBIC	Wavelength (nm)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Maximum Cable Distance

GBIC	Transmit Power		Receive Power		Power Budget
	Minimum	Maximum	Minimum	Maximum	

μ μ μ
μ μ μ
μ μ μ
μ μ μ
μ μ μ
μ μ μ


Note

Mode-Conditioning Patch Cord Description




Note


Note

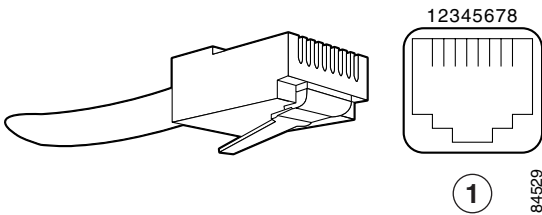
Gigabit Ethernet RJ-45 Connections on the NPE-G1 and NPE-G2

Pin	10/100 Signal	Gigabit Ethernet Signal


Note

Connecting to the I/O Controller Ethernet and Fast Ethernet Ports

Ethernet and Fast Ethernet RJ-45 Connections



1			
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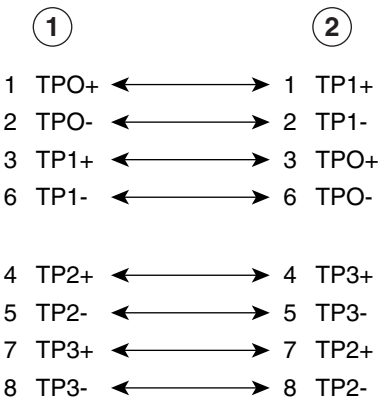

Warning

To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

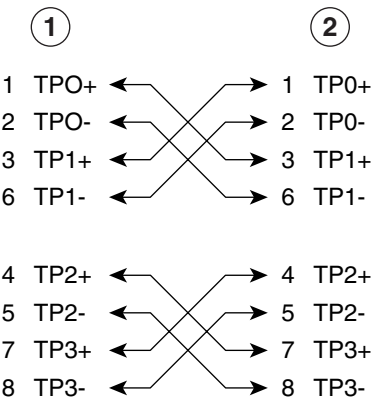
Pin	Description



Note



1		2	
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1		2	
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Ethernet and Fast Ethernet Straight-Through Cable Pinout, Ethernet Port to a Hub or Repeater

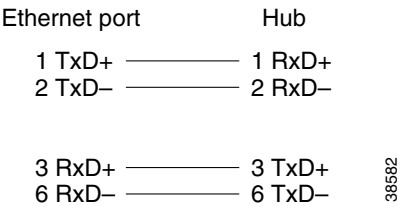


Figure 3-24 Ethernet and Fast Ethernet Crossover Cable Pinout, Ethernet Port to a DTE

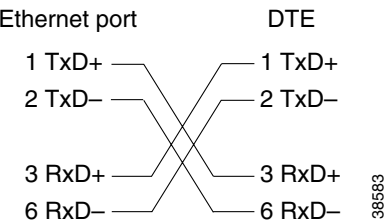
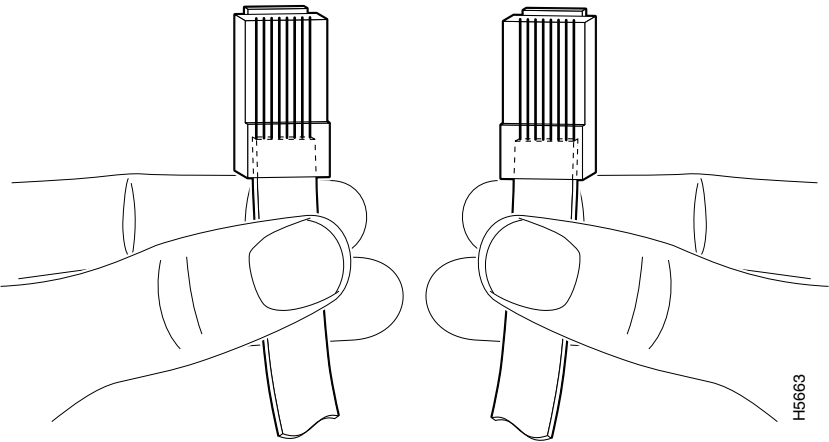
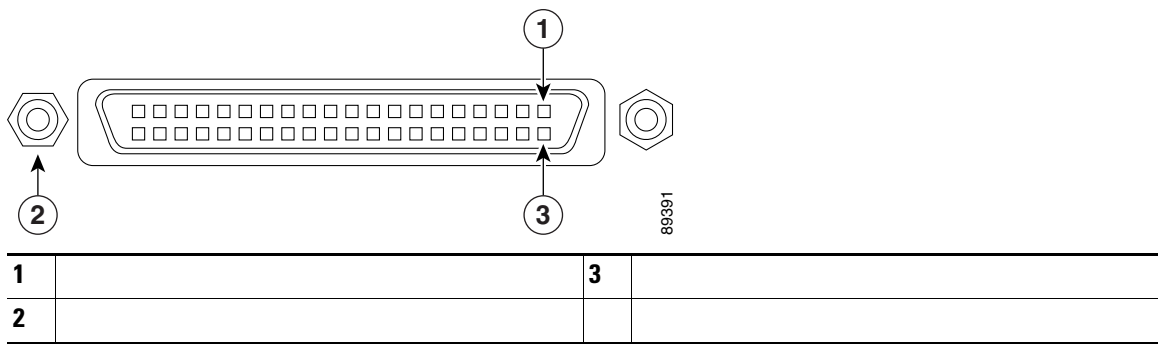


Figure 3-25 Crossover or Straight-Through Cable Identification



-
-

Figure 3-27 MII Port



Pin ¹	In	Out	I/O	Description
11	—	Yes	—	Transmit Error (Tx_ER)
13	—	Yes	—	Transmit Enable (Tx_EN)
3	—	Yes	—	MII Data Clock (MDC)
4–7	Yes	—	—	Receive Data (RxD)
9	Yes	—	—	Receive Clock (Rx_CLK) ²
10	Yes	—	—	Receive Error (Rx_ER)
8	Yes	—	—	Receive Data Valid (Rx_DV)
18	Yes	—	—	Collision (COL)
19	Yes	—	—	Carrier Sense (CRS)
2	—	—	Yes	MII Data Input/Output (MDIO)
22–39	—	—	—	Common (ground)
1, 20, 21, 40	—	—	—	+5.0 volts (V)

²Tx_CLK and Rx_CLK are provided by the external transceiver.

Connecting to the Console and Auxiliary Ports



Both the console and the auxiliary ports are asynchronous serial ports; any devices connected to these ports must be capable of asynchronous transmission. (Asynchronous is the most common type of serial device; for example, most modems are asynchronous devices.)

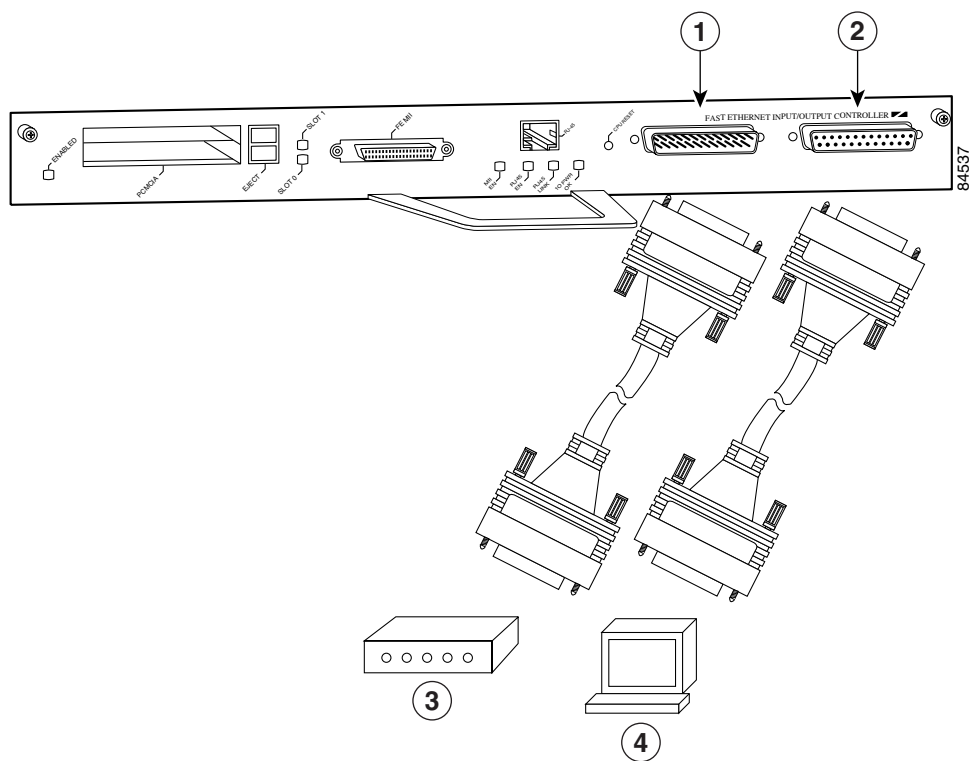
The I/O controller uses two types of physical media for console port and auxiliary port connections. [Table 3-13](#) describes the I/O controller console and auxiliary port media type for each model. The NPE-G1 and NPE-G2 use RJ-45 media for console port and auxiliary port connections. See [Table 3-18](#) for console port pinout information and [Table 3-19](#) for auxiliary port pinout information.

Console and Auxiliary Port Physical Media

Before connecting a terminal to the console port, configure the terminal to match the router console port as follows: 9600 baud, 8 data bits, no parity, 2 stop bits (9600 8N2). After you establish normal router operation, you can disconnect the terminal.

The DB-25 ports and connectors conform to the EIA/TIA-232 serial data transfer standard for communications between DTE and DCE equipment. [Figure 3-28](#) shows console and auxiliary port connections for DB-25 physical media.

Connecting I/O Controller, NPE-G1, or NPE-G2 Cables



1		3	
2		4	

DB-25 Console Port Signals and Pinouts

Pin ¹	Signal	Direction	Description

DB-25 Auxiliary Port Cabling and Pinouts

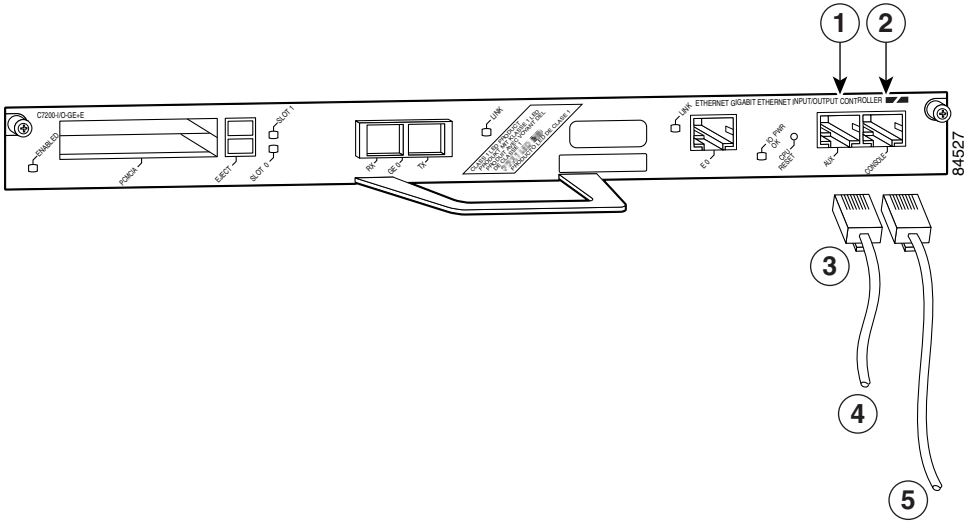
Pin ¹	Signal	Direction	Description



Note

RJ-45 Port Cabling and Pinouts

Connecting I/O Controller, NPE-G1, or NPE-G2 Cables



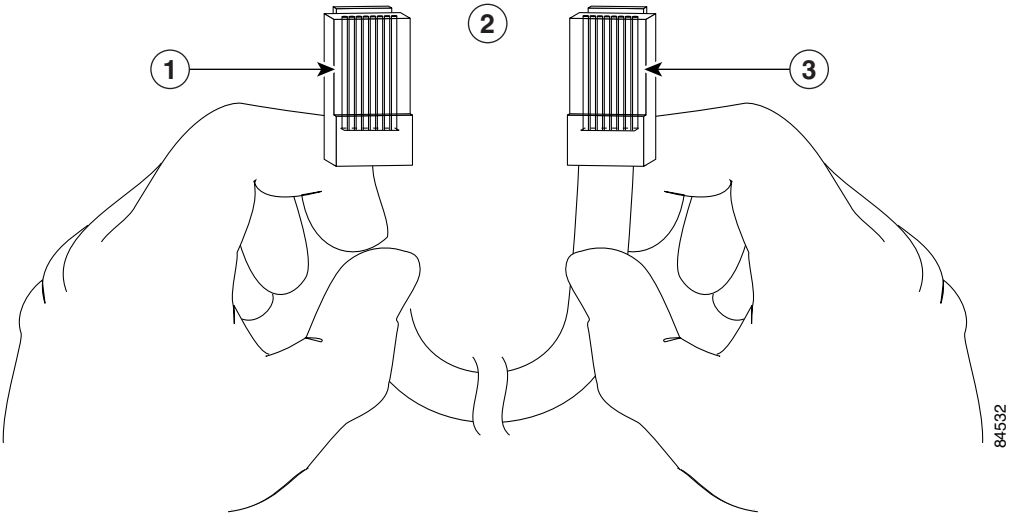
1		4	
2		5	
3			


Note


Note

Adapter	DTE M/F Pins ¹		²

The female data terminal equipment (FDTE) adapter that is available from Cisco is labeled “Terminal”.



1		3	
2			

Access Server Port	RJ-45 Cable Type	DB-25 Adapter	End Device

RJ-45 Console Port Signals and Pinouts

Pin ¹	Signal	Direction	Description

RJ-45 Auxiliary Port Signals and Pinouts for the NPE-G2, NPE-G1 and I/O Controllers

Pin ¹	Signal	Direction	Description

Pin ¹	Signal	Direction	Description



Note

Connecting Power



Warning

This unit might have more than one power cord. To reduce the risk of electric shock, disconnect the two power supply cords before servicing the unit. Statement 14



Note



Warning

The AC power supply has double pole/neutral fusing.

Connecting AC-Input Power

Step 1

Step 2

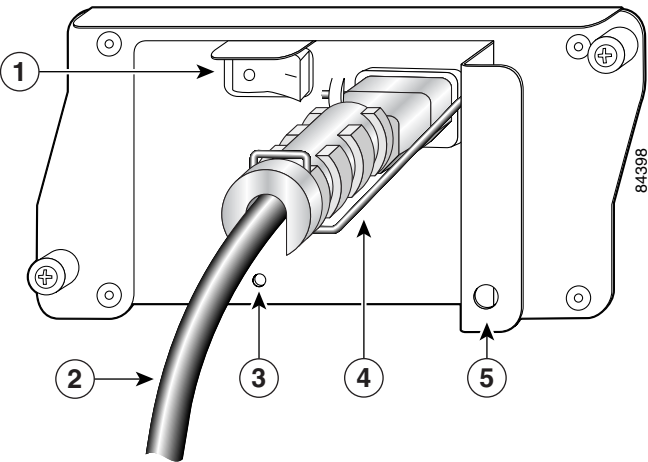
Step 3



Note

Step 4

Step 5



1		4	
2		5	
3			

Connecting DC-Input Power



Note



Warning

Before completing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. Statement 322



Warning

When installing the unit, always make the ground connection first and disconnect it last. Statement 42



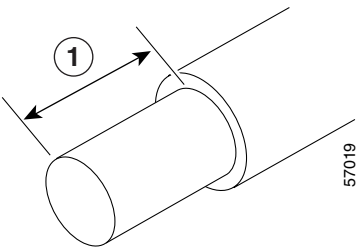
Caution

Step 1

Step 2

Step 3

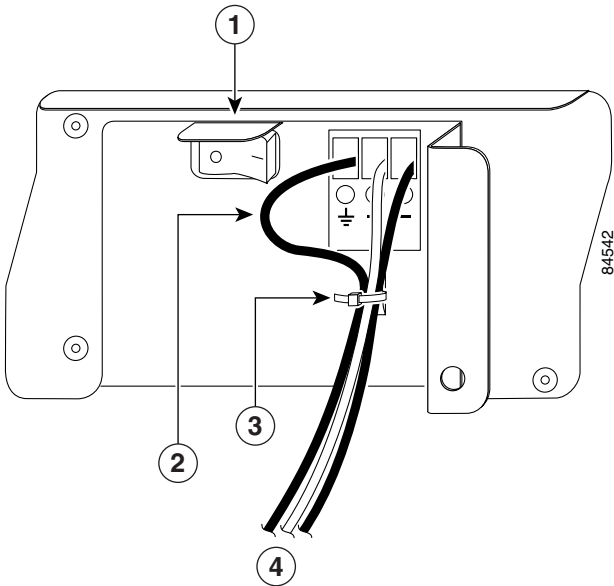
Step 4



1		
---	--	--

Step 5

Connecting Power



1		3	
2		4	

Step 6



Note

Step 7



Note

Step 8



Observing System Startup and Performing a Basic Configuration

-
-
-
-
-
-
-
-



Note

Checking Conditions Prior to System Startup

-
-

-
-
-
-

Starting the System and Observing Initial Conditions

Step 1



Note

Step 2

Step 3

Step 4

```
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-JS-M), Released Version 12.0(19980705:021501)Copyright (c)
1986-1998 by cisco Systems, Inc.
Compiled Tue 25-Aug-98 14:38 by xxxxx
Image text-base: 0x600088C4, data-base: 0x60FA6000
```

```
--- System Configuration Dialog ---
```

```
At any point you may enter a questions mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '['].
```

```
continue with configuration dialog? [yes]:
```



1.1 User Note for the 7xxx Routers

Security Device Manager (SDM), Version



version

show version

show



Performing a Basic Configuration Using AutoInstall

- 1.
- 2.

Step 1
Step 2


Note

copy running-config startup-config

Hostname# copy running-config startup-config



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cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-JS-M), Released Version 12.0(19980705:021501)Copyright(c)
1986-1998 by cisco Systems, Inc.
Compiled Thu 15-Oct-98 02:20 by xxxxx
Image text-base: 0x600088C4, data-base: 0x60FA6000

cisco 7206VXR (NPE300) processor with 61440K/20480K bytes of memory.
R7000 CPU at 262Mhz, Implementation 39, Rev 1.0, 256KB L2, 2048KB L3 Cache
Six slot VXR midplane, Version 2.0

Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
8 Ethernet/IEEE 802.3 interface(s)
3 FastEthernet/IEEE 802.3 interface(s)
125K bytes of non-volatile configuration memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).!!

Press RETURN to get started!

--- System Configuration Dialog ---

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Return

Would you like to enter the initial configuration dialog? [yes]:

First, would you like to see the current interface summary? [yes]:

Any interface listed with OK? value "NO" does not have a valid configuration

Interface	IP-Address	OK?	Method	Status	Protocol
ATM1/0	unassigned	NO	unset	down	down
FastEthernet2/0	unassigned	NO	unset	down	down

Configuring global parameters:

Enter host name [Router]:

The enable secret password is a one-way cryptographic secret
password used instead of the enable password when it exists.

Enter enable secret: **barney**

betty

fred

yes

yes

yes

Your IGRP autonomous system number [1]: 15

router

barney

betty

fred

the **media-type** interface command to select the media type, either the GBIC (**gbic**) for NPE-G1 or SFP (**sfp**) for NPE-G2, RJ-45 (**rj45**) port.



Changing the Media Type of the Native Gigabit Ethernet GBIC or SFP or RJ-45 Ports

the **media-type** interface command:

media-type **gbic** | **sfp** | **rj45**

```
media-type rj45
end
```

Configuring the Interface Transmission and Speed Modes

Step 1

duplex



These commands are only applicable when using the RJ-45 media.

```
speed { 10 | 100 | 1000 | auto }
duplex { full | half | auto }
```

The following speed/duplex settings are supported:

1000 **auto**

1000 Mbps

negotiation auto

no negotiation

auto



media-type

media-type

media-type SFP

The following shows a typical configuration for the three Gigabit Ethernet interfaces on the NPE-G1. In this example, the first interface is configured for the GBIC media type, the second interface is configured for the RJ-45 media type, and the third interface is not used.



ip address	media-type	speed

show interface
GigabitEthernet 0/X (where X is 1, 2, or 3) and **show controllers GigabitEthernet 0/1**
show interface

show controller
interface. For example, it shows the detected link status, speed, and duplex, and also determines the current status of autonegotiation and the link partners' abilities (if it is an autonegotiation-capable

show controller
show controller

clear interface GigabitEthernet 0/X

clear counters GigabitEthernet 0/X

Configuring ATM Interfaces

Step 1

1.1.1.10

Class C network is 1.1.1.0, 0 subnet bits; mask is /24

Configure IPX on this interface? [no]:
IPX network number [2]:

Configure AppleTalk on this interface? [no]:
Extended AppleTalk network? [no]:
AppleTalk starting cable range [0]:



Configuring interface parameters:

Configuring interface FastEthernet2/0:
Is this interface in use? [yes]:
Use the 100 Base-TX (RJ-45) connector? [yes]:
Operate in full-duplex mode? [no]:
Configure IP on this interface? [yes]:
IP address for this interface: **1.1.1.20**

yes

yes

yes



Configuring Synchronous Serial Interfaces

Step 1

1.1.1.1.30

yes

yes yes



1.1.1.10

yes
yes

1.1.1.20

yes
yes

yes
yes

1.1.1.30

yes
yes

```
enable secret 5 $1$u8z3$PMYY8em./8sszhzk78p/Y0
enable password betty
line vty 0 4
password fred
snmp-server community public
!
ip routing
no vines routing
ipx routing
appletalk routing
no apollo routing
no decnet routing
no xns routing
no clns routing
no bridge 1
! Turn off IPX to prevent network conflicts.
interface ATM1/0
ip address 1.1.1.10 255.0.0.1
appletalk cable-range 0-0 0.0
appletalk discovery
!
interface FastEthernet2/0
media-type 100BaseX
```

```
half-duplex
ip address 1.1.1.20 255.0.0.2
appletalk cable-range 0-0 0.0
appletalk discovery
!
interface serial3/0
ip address 1.1.1.30 255.0.0.3
ip route-cache cbus
no keepalive
!
!
router igrp 15
network 1.0.0.0
!
end
```

Use this configuration? [yes/no]:

Building configuration...

Use the enabled mode 'configure' command to modify this configuration.

Press RETURN to get started!

Would you like to enter the initial dialog? [yes]:

(Router>)

Router>

Router#

Router# **config terminal**

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#

Router(config)#

slot/port

Control

Z

end

Ctrl-Z

?

Help

running-config startup-config

copy

show running-config

show running-config

show startup-config

configure

show

		Chassis slot—always 0 Interface port—1, 2, or 3	Gigabit Ethernet 0/1 Gigabit Ethernet 0/2 Gigabit Ethernet 0/3
C7200-I/O-GE+E	Gigabit Ethernet (port GE0)	Chassis slot—always 0 Interface port—0	gigabitethernet 0/0
	Ethernet (port E0)	Chassis slot—always 0 Interface port—0	fastethernet 0/0
C7200-I/O-2FE/E	Fast Ethernet/Ethernet (port0)	Chassis slot—always 0 Interface port—0	fastethernet 0/0
	Fast Ethernet/Ethernet (port1)	Chassis slot—always 0 Interface port—1	fastethernet 0/1
C7200-I/O-FE ²	Fast Ethernet (MII or RJ-45)	Chassis slot—always 0 Interface port—0	fastethernet 0/0
C7200-I/O	No interface ports	—	—
C7200-I/O-FE-MII ³	Fast Ethernet (MII)	Chassis slot—always 0 Interface port—0	fastethernet 0/0

1. Both optical and copper ports report the same syntax. For example, Gigabit Ethernet RJ-45 port 0/2 reports GigabitEthernet 0/2, as does Gigabit Ethernet GBIC port 0/2.
2. The Product Number C7200-I/O-FE does not specify MII because both an MII and an RJ-45 receptacle are included.
3. The I/O controller with the Product Number C7200-I/O-FE-MII has a single MII FastEthernet receptacle only. Although still supported by Cisco Systems, this I/O controller with a single MII receptacle is no longer an orderable product as of May 1998.

This section describes how to recover a lost enable or console login password, and how to replace a lost enable secret password on your Cisco 7200 VXR router.



It is possible to recover the enable or console login password. The enable secret password is encrypted, however, and must be replaced with a new enable secret password.

Following is an overview of the steps in the password recovery procedure:

If you can log in to the router, enter the `show startup-config` command to determine the existing configuration register value.

Press the **Break**



show startup-config



show version

Break

Break

confreg

yes to the enable “ignore system config info?” question, and note the current configuration register settings.

Initialize the router by entering the command as follows:

The router initializes, the configuration register is set to 0x142, and the router boots the system image from Flash memory and enters the System Configuration Dialog (prompt) as follows:

Enter in response to the System Configuration Dialog prompts until the following message is displayed:

Press **Return**.

enable

show startup-config



configure memory

configure terminal

newpassword1
newpassword2
newpassword3

interface fastethernet 0/0
no shutdown

config-register 0x2102



Viewing Your System Configuration

show version

```
term1_500 uptime is 1 day, 19 hours, 25 minutes
System returned to ROM by reload at 00:04:18 UTC Tue Nov 30 1999
System image file is "disk2:c7200-js-mz.dev-test.dec21"
```

```
cisco 7206VXR (NPE-G1) processor (revision 0x00) with 245760K/16384K bytes of memory.
Processor board ID 13250983
BCM12500 CPU at 700Mhz, Implementation 1, Rev 0.1, 512KB L2 Cache
6 slot VXR midplane, Version 2.0
```

```
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
5 FastEthernet/IEEE 802.3 interface(s)
3 Gigabit Ethernet/IEEE 802.3 interface(s)
509K bytes of non-volatile configuration memory.
```

```
62528K bytes of ATA PCMCIA card at slot 2 (Sector size 512 bytes).
16384K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

```
Router#
Slot 0:
  Dual FastEthernet (RJ-45) I/O Card Port adapter, 2 ports
  Port adapter is analyzed
  Port adapter insertion time 1d19h ago
  EEPROM contents at hardware discovery:
    Hardware Revision      :0.0
    Board Revision         :01
    Connector Type         :FF
```

Hardware date code :20000413
Top Assy. Part Number :800-07114-01
PCB Serial Number :PROT-----
EEPROM format version 4
EEPROM contents (hex):
0x00:04 FF 40 02 15 41 00 00 42 30 31 05 FF 83 01 31
0x10:2E 9D C0 46 03 20 00 1B CA 01 C1 8B 50 52 4F 54
0x20:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x30:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x40:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x50:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x60:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Slot 2:

Dual Port FastEthernet (RJ45) Port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time 1d19h ago
EEPROM contents at hardware discovery:
Hardware Revision :1.0
PCB Serial Number :MIC04412B9X
Part Number :73-5419-04
Board Revision :A0
RMA Test History :00
RMA Number :0-0-0-0
RMA History :00
Deviation Number :0-0
Product Number :PA-2FE-TX
Top Assy. Part Number :800-08350-04
EEPROM format version 4
EEPROM contents (hex):
0x00:04 FF 40 02 24 41 01 00 C1 8B 4D 49 43 30 34 34
0x10:31 32 42 39 58 82 49 15 2B 04 42 41 30 03 00 81
0x20:00 00 00 00 04 00 80 00 00 00 00 CB 94 50 41 2D
0x30:32 46 45 2D 54 58 20 20 20 20 20 20 20 20 20
0x40:20 C0 46 03 20 00 20 9E 04 FF FF FF FF FF FF
0x50:FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x60:FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70:FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Slot 5:

Fast-ethernet (TX-ISL) Port adapter, 1 port
Port adapter is analyzed
Port adapter insertion time 1d19h ago
EEPROM contents at hardware discovery:
Hardware revision 1.2 Board revision D0
Serial number 12384576 Part number 73-1688-04
Test history 0x0 RMA number 00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20:01 11 01 02 00 BC F9 40 49 06 98 04 00 00 00 00
0x30:68 00 00 00 99 06 01 00 FF FF FF FF FF FF FF

Performing Complex Configurations



Troubleshooting the Installation

-
-
-
-
-

Troubleshooting Overview

-
-
-
-
-
-

	Action	Yes	No
Step 1			
Step 2			
Step 3			
Step 4			
Step 5			
Step 6			
Step 7			
Step 8			
Step 9			

Problem Solving Using a Subsystems Approach

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-

-

Identifying Startup Problems



Note

Fans Operating

Power LEDs

I/O Controller LEDs



Note

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Note

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Note

-

NPE-G1 or NPE-G2 LEDs

-

-

-

-

-

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-
-

Port Adapter Jacket Card LEDs

-
-

Port Adapter LEDs

System Bootup Banner

Troubleshooting the Power Subsystem

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Troubleshooting the NPE-G1 or NPE-G2

-

-

-

-

-

Troubleshooting the Network Processing Engine or Network Services Engine

Troubleshooting the Port Adapter Jacket Card

-

-

Troubleshooting the Port Adapters or Service Adapters

-

-

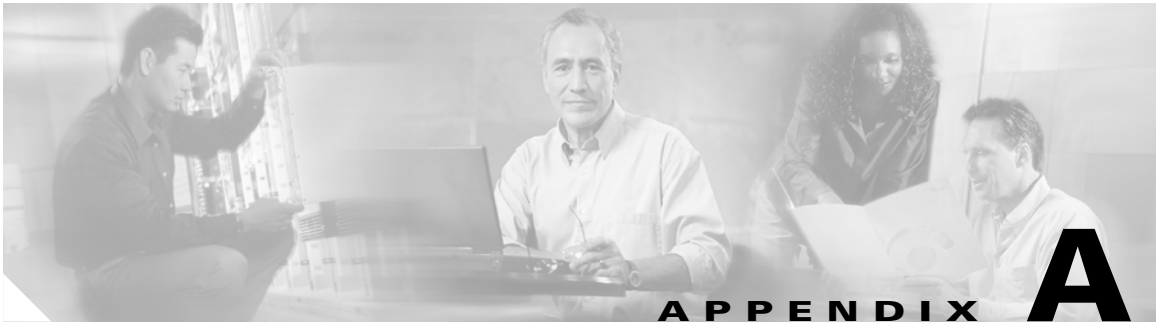
Troubleshooting the Cooling Subsystem

-

-

Queued messages:

%ENVM-1-SHUTDOWN: Environmental Monitor initiated shutdown



Bit No.	Hex	Meaning

Bits 0–3

Bits 0–3 Settings


```
> b [tftp] flash filename
```



Action/File Name	Bit 3	Bit 2	Bit 1	Bit 0

Bit 6

Bit 7

Bit 8

Bit 10 and Bit 14

Bit 14	Bit 10	IP Address (<net> <host>)

Bit 11 and Bit 12

Baud	Bit 12	Bit 11

Bit 13

Bit 15

Displaying the Configuration Register While Running Cisco IOS

Displaying the Configuration Register While Running ROM Monitor

```
Configuration register = 0x100 at last boot
Bit#      Configuration register option settings:
15        Diagnostic mode disabled
14        IP broadcasts do not have network numbers
13        Boot default ROM software if network boot fails
12-11     Console speed is 9600 baud
```

```

10      IP broadcasts with ones
09      Do not use secondary bootstrap
08      Break disabled
07      OEM disabled
06      Ignore configuration disabled
05      Fast boot disabled
04      Fan boot disabled
03-00   Boot to ROM monitor

```

```
rommon1 >
```

```

Configuration Summary
enabled are:
load rom after netboot fails
console baud: 9600
boot: the ROM Monitor

```

```
Do you wish to change the configuration? y/n [n]
```

Setting the Configuration Register While Running Cisco IOS

```

Router#
Enter configuration commands, one per line. End with CNTRL/Z.
Router (config)#config-register 0x2142
      (config)#end

```

```
0x2102
```

```
confreg
```

```

enable "diagnostic mode"? y/n [n]: n
enable "use net in IP bcast address"? y/n [n]: n
disable "use rom after netboot fails"? y/n [n]: n
enable "use all zero broadcast"? y/n [n]: n

```

```
enable "break/abort has effect"? y/n [n]: n
enable "ignore system config info"? y/n [n]: n
change console baud rate? y/n [n]: n
change the boot characteristics? y/n [n]:y
enter to boot:
0 = ROM Monitor
1 = the boot helper image
2 - 15 = boot system
[0]: 2

Configuration Summary:
enabled are:
load rom after netboot fails
console baud: 9600
boot: image sepcified by the boot system commands or default to: cisco2-c7200

do you wish to change the configuration? y/n [n] n

You must reset or power cycle for new config to take effect
rommon 2 >
```





A

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C



I _____ ■

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